NOIDA METRO RAIL CORPORATION (NMRC) LIMITED

CONTRACT NO: NGNECC-01

Part Design & Construction of Elevated Viaduct and 10 nos. of Elevated Stations for Extension Projects of NMRC's Aqua Line from Botanical Garden to Noida Sec-142 (from Chainage (-) 383.959 to 12130.143) and from Depot Station to Boraki MMTH (Chainage 28678.253 to 31263.482).

E Tender No.: NMRC/Projects/NGNECC-01/2026/457

TENDER DOCUMENTS

VOLUME 7

Geotechnical Investigation Reports

Noida Metro Rail Corporation (NMRC) Limited
Block-III, 3rdFloor, Ganga Shopping Complex, Sector-29, Noida -201301,
District Gautam Budh Nagar, Uttar Pradesh, India

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Report By:

GOMA ENGINEERING AND CONSULTANCY

Geotech Investigation Report

for

Proposed Extension Metro corridors

of Aqua Line from

SECTOR-142 TO BOTANICAL GARDEN

(0-380 km to 12+130 km)

under the project

named as

"GEOTECHNICAL INVESTIGATION WORK FOR PROPOSED EXTENSION METRO CORRIDORS OF AQUA LINE FROM NOIDA SECTOR-142 TO BOTANICAL GARDEN AND DEPOT STATION TO BORAKI MMTH (14.16 KM)"

Submitted To:

NOIDA METRO RAIL CORPORATION LIMITED

Report No:		Revision:
158_SEC142 TO BOGA_R0	05/05/2026	RV00

SECTOR-142 TO BOTANICAL GARDEN (0-380 km to 12+130 km)	
Report No:	**158_SEC142 TO BOGA_R0**
Client:	**NOIDA METRO RAIL CORPORATION LIMITED**
Consultant:	–
Field Drilling Agency:	**GOMA ENGINEERING AND CONSULTANCY**

Current Revision

Current Revision	Prepared By	Reviewed By	Approved By	Date Approved	Reason for Review
	Designation				
	Senior Engineer	Technical Expert	Quality Manager		
RV00	J KHANAPARA S MARSONIA	D PATEL	H MAKADIYA D PATEL	05/05/2026	Final Report

Revision History

Revision	Prepared By	Reviewed By	Approved By	Date Approved	Reason for Review
	Designation				
	Senior Engineer	Technical Expert	Quality Manager		
RV00	J KHANAPARA S MARSONIA	D PATEL	H MAKADIYA D PATEL	05/05/2026	Final Report

Revision Summary

Paragraph Modified	Details of Modification

ACKNOWLEDGEMENT CERTIFICATE

We express our sincere gratitude to **NOIDA METRO RAIL CORPORATION LTD** for entrusting us with the Geotechnical Investigation work for the project titled:

"GEOTECHNICAL INVESTIGATION WORK FOR PROPOSED EXTENSION METRO CORRIDORS OF AQUA LINE FROM NOIDA SECTOR-142 TO BOTANICAL GARDEN AND DEPOT STATION TO BORAKI MMTH (14.16 KM)"

(LOA No. NMRC/DGM/Civil/F.No.J-69/2025/17124)

Particulars of This Report

- **Stage / Corridor:** *Sector-142 to Botanical Garden*
- **Chainage Covered:** 0-380 to 12+130
- **Length of Stretch Covered in This Report:** 12.530 km
- **Report Reference No.:** 158_SEC142 TO BOGA_R0

This report forms part of the detailed geotechnical investigation carried out for the above-mentioned metro corridor extension project. The investigation has been executed and reported in kilometer-wise stretches in accordance with project specifications and guidelines.

We sincerely appreciate the continuous support, coordination, and cooperation extended by NMRC officials, project management representatives, and site authorities during the execution of field and laboratory investigations.

The investigations and reporting have been carried out in accordance with relevant Indian Standards including IS 1892, IS 1893, IS 2131, IS 2911, IS 6403, IS 2720 (series), and other applicable codes of practice.

This report has been prepared with due professional care and diligence. We trust that the findings and recommendations presented herein will assist NMRC in the safe and economical design of foundations and associated civil works for the proposed metro corridor extension.

D P Patel
(Authorized Signatory)
GOMA ENGINNERING AND CONSULTANCY

NABL ACCEREDIATION CERTIFICATE

National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

GOMA ENGINEERING AND CONSULTANCY

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

"GOMA HOUSE" F- 88, TULSI ESTATE, SARKHEJ- BAVLA HIGHWAY CHANGODAR, AHMEDABAD, GUJARAT, INDIA

in the field of

TESTING

Certificate Number: TC-12603

Issue Date: 15/11/2025 Valid Until: 14/11/2029

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: GOMA ENGINEERING AND CONSULTANCY

Signed for and on behalf of NABL

Anuja Anand
Director

Chakravarthy T. Kannan
Chief Executive Officer

CONTENTS

1 INTRODUCTION 16
1.1 Project Information 16
1.2 Purpose of Study 18
1.3 Scope of Geotechnical Investigation 19
1.4 Regional Geology, History and Hydrology 20
1.4.1 Regional Geological Setting 20
1.4.2 Geological Characteristics (Engineering Perspective) 21
1.4.3 Historical Development of Noida 21
1.4.4 Hydrological Setting 21
1.4.5 Hydrogeological Implications 22
1.4.6 Summary 22
2 GROUND INVESTIGATION BY BOREHOLE DRILLING 23
2.1 Soil Boring 23
2.1.1 Disturbed and Undisturbed Sample Collection 27
2.1.2 Standard Penetration Test: (SPT) 27
2.2 Additional In-Situ Field Testing 29
2.2.1 Field Permeability Test 29
3 LABORATORY TESTING 30
3.1 Laboratory Testing of Soil Sample 31
3.1.1 Grain Size Analysis 31
3.1.2 Atterberg's Limits 31
3.1.3 Natural Moisture Content 31
3.1.4 Bulk and Dry Density 32
3.1.5 Specific Gravity 32
3.1.6 Direct Shear Test 32
3.1.7 Consolidation Test 33
3.1.8 Triaxial Compression Test 33
4 SUBSURFACE STRATIGRAPHY AND GEOTECHNICAL PROPERTIES OF SOIL 34
4.1 Subsurface Stratification 34
4.1.1 Zone 1: CH: 0-372 km to 0+500 km (BH-(-02) to BH-(-09)) 36
4.1.2 Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09) 37
4.1.3 Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A) 38
4.1.4 Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30) 39
4.1.5 Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40) 40
4.1.6 Zone 6: CH: 4+515 km to 5+530 km (BH-41 to BH-50) 41
4.1.7 Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60) 42
4.1.8 Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70) 43
4.1.9 Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80) 44
4.1.10 Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89) 45

4.1.11 Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100) 46
4.1.12 Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109) 47
4.1.13 Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116) 48
4.2 Geotechnical Properties of Soil 49
4.2.1 Geotechnical Properties of soil - Zone 1: CH: 0-372 km to 0+500 km (BH-(-02) to BH-(-09)) 50
4.2.2 Geotechnical Properties of soil - Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09) 51
4.2.3 Geotechnical Properties of soil - Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A) 52
4.2.4 Geotechnical Properties of soil - Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30) 53
4.2.5 Geotechnical Properties of soil - Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40) 54
4.2.6 Geotechnical Properties of soil - Zone 6: CH: 4+520 km to 5+530 km (BH-41 to BH-50) 55
4.2.7 Geotechnical Properties of soil - Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60) 56
4.2.8 Geotechnical Properties of soil - Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70) 57
4.2.9 Geotechnical Properties of soil - Zone 9 CH: 7+490 km to 8+550 km (BH-71 to BH-80) 58
4.2.10 Geotechnical Properties of soil - Zone 10 CH: 8+550 km to 9+430 km (BH-82 to BH-89) 59
4.2.11 Geotechnical Properties of soil - Zone 11 CH: 9+430 km to 10+540 km (BH-91 to BH-100) 60
4.2.12 Geotechnical Properties of soil - Zone 12 CH: 10+540 km to 11+400 km (BH-101 to BH-109) 61
4.2.13 Geotechnical Properties of soil - Zone 13 CH: 11+400 km to 12+130 km (BH-111 to BH-116) 62
4.3 Chemical Test Results of Soil and Groundwater 63
5 FOUNDATION ANALYSIS 64
5.1 Concepts for Foundation Analysis 64
5.1.1 Open Foundation on Soil 64
5.1.2 Open Foundation on Rock 65
5.2 Load carrying Capacity Assessment of Pile Foundation 67
5.2.1 Pile Founded in Granular Soil 67
5.2.2 Pile Founded in Cohesive Soil 67
5.2.3 Bored Pile Socketed into Rock 67
5.2.4 Pile Founded in Weathered/Soft Rock 69
6 SEISMICITY AND TECTONIC SETTING 70
6.1 Earthquake History of the Region 70
6.2 Faulting and Tectonic Features 71
7 LIQUEFACTION POTENTIAL ASSESSMENT 73
7.1 Liquefaction Susceptibility Assessment 73
7.2 Methodology of Liquefaction Potential Assessment 73
7.2.1 Determination of Seismic Parameters 73
7.2.2 Determination of Vertical Stresses 73
7.2.3 Stress Reduction Factor (r_d) 73
7.2.4 Calculation of Cyclic Stress Ratio (CSR) 74
7.2.5 Evaluation of Soil Resistance: Cyclic Resistance Ratio (CRR) 75
7.2.6 Magnitude Scaling Factor (MSF) 76
7.2.7 Overburden Stress Correction (K_σ) 76
7.2.8 Static Shear Stress Correction (K_α) 76

7.2.9 Factor of Safety Against Liquefaction 76
7.2.10 Post-Liquefaction Effects 76
7.2.11 Consideration of Parameters for Liquefaction Assessment 76
7.3 Results of Liquefaction Analysis 77
8 FOUNDATION RECOMMENDATIONS 79
8.1 Pile Design Considerations 79
8.2 Recommendation for Cement/Concrete 82
9 CONCLUSION & RECOMMENDATION 83

APPENDIX A SUMMARY OF PILE LOAD CARRYING CAPACITY 84
A.1. Zone 1: CH: 0-380 km to 0+500 km (BH-(-02) to BH-(-10)) 85
A.2. Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09) 117
A.3. Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A) 159
A.4. Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30) 219
A.5. Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40) 270
A.6. Zone 6: CH: 4+515 km to 5+530 km (BH-41 to BH-50) 318
A.7. Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60) 367
A.8. Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70) 416
A.9. Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80) 474
A.10. Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89) 511
A.11. Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100) 548
A.12. Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109) 590
A.13. Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116) 632
APPENDIX B SUMMARY LIQUEFACTION POTENTIAL ASSESSMENT 660
B.1. Zone 1: CH: 0-380 km to 0+500 km (BH-(-02) to BH-(-10)) 661
B.2. Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09) 669
B.3. Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A) 679
B.4. Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30) 694
B.5. Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40) 706
B.6. Zone 6: CH: 4+515 km to 5+530 km (BH-41 to BH-50) 717
B.7. Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60) 728
B.8. Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70) 739
B.9. Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80) 752
B.10. Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89) 761
B.11. Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100) 770
B.12. Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109) 780
B.13. Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116) 790

APPENDIX C BORELOG & TEST RESULTS **797**
C.1. Zone 1: CH: 0-372 km to 0+500 km (BH-(-02) to BH-(-09) 798
C.2. Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09) 833
C.3. Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A) 878
C.4. Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30) 943
C.5. Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40) 999
C.6. Zone 6: CH: 4+515 km to 5+530 km (BH-41 to BH-50) 1053
C.7. Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60) 1112
C.8. Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70) 1169
C.9. Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80) 1234
C.10. Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89) 1274
C.11. Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100) 1314
C.12. Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109) 1359
C.13. Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116) 1404
APPENDIX C1 CHEMICAL TEST RESULTS SOIL & GROUNDWATER **1434**
APPENDIX D SPT RESULTS **1441**
D.1 Zone 1: CH: 0-380 km to 0+500 km (BH-(-02) to BH-(-10)) 1442
D.2 Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09) 1449
D.3 Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A) 1458
D.4 Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30) 1471
D.5 Zone 5: CH: CH: 3+515 km to 4+520 km (BH-31 to BH-40) 1482
D.6 Zone 6: CH: CH: 4+515 km to 5+530 km (BH-41 to BH-50) 1492
D.7 Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60) 1502
D.8 Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70) 1512
D.9 Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80) 1524
D.10 Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89) 1532
D.11 Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100) 1540
D.12 Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109) 1549
D.13 Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116) 1558
APPENDIX E FIELD PERMEABILITY TEST RESULTS **1564**
E.1 Zone 1: CH: 0-380 km to 0+500 km (BH-(-02) to BH-(-10)) 1565
E.2 Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09) 1572
E.3 Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A) 1581
E.4 Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30) 1594
E.5 Zone 5: CH: CH: 3+515 km to 4+520 km (BH-31 to BH-40) 1605
E.6 Zone 6: CH: CH: 4+515 km to 5+530 km (BH-41 to BH-50) 1615
E.7 Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60) 1625
E.8 Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70) 1634
E.9 Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80) 1645

E.10 Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89) 1653
E.11 Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100) 1660
E.12 Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109) 1669
E.13 Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116) 1678
APPENDIX F SITE INVESTIGATION PHOTOGRAPHS 1684
F.1 Zone 1: CH: 0-372 km to 0+500 km (BH-(-02) to BH-(-10)) 1685
F.2 Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09) 1687
F.3 Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A) 1690
F.4 Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30) 1694
F.5 Zone 5: CH: CH: 3+515 km to 4+520 km (BH-31 to BH-40) 1697
F.6 Zone 6: CH: CH: 4+515 km to 5+530 km (BH-41 to BH-50) 1700
F.7 Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60) 1703
F.8 Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70) 1706
F.9 Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80) 1709
F.10 Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89) 1711
F.11 Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100) 1713
F.12 Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109) 1716
F.13 Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116) 1719
APPENDIX G GEOLOGICAL PLAN & PROFILE

BLANK PAGE

BLANK PAGE

LIST OF FIGURES

Figure 1 Proposed Alignment of Aqua Line from Sector-142 to Botanical Garden 16

Figure 2 Geological Map of Uttar Pradesh (Geological Survey of India MISC. PUB. NO. 30,PART-(XIII), 2019 20

Figure 3 Thin Wall Shelby Tube Sampler 27

Figure 4 Split Spoon Sampler (SPT) 27

Figure 5 Borehole Location Sector 142 to Botanical Garden (CH: 0-380 km to 0+500 km) 36

Figure 6 Borehole Location Sector 142 to Botanical Garden (CH: 0+500 km to 1+450 km) 37

Figure 7 Borehole Location Sector 142 to Botanical Garden (CH: 1+450 km to 2+515 km) 38

Figure 8 Borehole Location Sector 142 to Botanical Garden (CH: 2+515 km to 3+515 km) 39

Figure 9 Borehole Location Sector 142 to Botanical Garden (CH: 3+515 km to 4+520 km) 40

Figure 10 Borehole Location Sector 142 to Botanical Garden (CH: 4+520 km to 5+530 km) 41

Figure 11 Borehole Location Sector 142 to Botanical Garden (CH: 5+530 km to 6+490 km) 42

Figure 12 Borehole Location Sector 142 to Botanical Garden (CH: 6+490 km to 7+490 km) 43

Figure 13 Borehole Location Sector 142 to Botanical Garden (CH: 7+490 km to 8+550 km) 44

Figure 14 Borehole Location Sector 142 to Botanical Garden (CH: 8+550 km to 9+430 km) 45

Figure 15 Borehole Location Sector 142 to Botanical Garden (CH: 9+430 km to 10+540 km) 46

Figure 16 Borehole Location Sector 142 to Botanical Garden (CH: 10+540 km to 11+400 km) 47

Figure 17 Borehole Location Sector 142 to Botanical Garden (CH: 11+400 km to 12+130 km) 48

Figure 18 Settlement per Unit Pressure from Standard Penetration Resistance (Figure 9, IS 8009 (Part-1)-1976) 65

Figure 19 Epicentres of Past Earthquakes in India (Annex A, IS 1893 (Part-1) 2016) 70

Figure 20 Major Tectonic Features of Delhi NCR 72

Figure 21 Seismic Zones of India (Figure-1, IS 1893 (Part-1) 2016) 74

Figure 22 Relation Between $CRR_{7.5}$ and $(N_{1(60)})$ (Fig.8, Annex F, IS 1893 (Part-1): 2016) 75

Figure 23 Summary of Liquefiable Soil Depth within the Zone 78

LIST OF TABLES

Table 1 Summary of Geotechnical Investigation and Tests Conducted for Proposed project 19

Table 2 Summary of Field Borehole Drilling Activities 23

Table 3 SPT ‘N” Value Correlation with Relative Density and Consistency 28

Table 4 Laboratory Tests and Relevant IS Standard of Test 30

Table 5 Summary of Zone Divided for Stratification 34

Table 6 Subsurface Stratification (BH-(-02) to BH-(-09)) 36

Table 7 Subsurface Stratification (BH-01 to BH-09) 37

Table 8 Subsurface Stratification (BH-11 to BH-20A) 38

Table 9 Subsurface Stratification (BH-21 to BH-30) 39

Table 10 Subsurface Stratification (BH-31 to BH-40) 40

Table 11 Subsurface Stratification (BH-41 to BH-50) 41

Table 12 Subsurface Stratification (BH-51 to BH-60) 42

Table 13 Subsurface Stratification (BH-61 to BH-70) 43

Table 14 Subsurface Stratification (BH-71 to BH-80) 44

Table 15 Subsurface Stratification (BH-82 to BH-89) 45

Table 16 Subsurface Stratification (BH-91 to BH-100) 46

Table 17 Subsurface Stratification (BH-101 to BH-109) 47

Table 18 Subsurface Stratification (BH-111 to BH-116) 48

Table 19 Geotechnical Properties of soil - Zone 1 50

Table 20 Geotechnical Properties of soil - Zone 2 51

Table 21 Geotechnical Properties of soil - Zone 3 52

Table 22 Geotechnical Properties of soil - Zone 4 53

Table 23 Geotechnical Properties of soil - Zone 5 54

Table 24 Geotechnical Properties of soil - Zone 6 55

Table 25 Geotechnical Properties of soil - Zone 7 56

Table 26 Geotechnical Properties of soil - Zone 8 57

Table 27 Geotechnical Properties of soil - Zone 9 58

Table 28 Geotechnical Properties of soil - Zone 10 59

Table 29 Geotechnical Properties of soil - Zone 11 60

Table 30 Geotechnical Properties of soil - Zone 12 61

Table 31 Geotechnical Properties of soil - Zone 13 62

Table 32 Net Safe Bearing Pressure (q_{ns}) based on Rock Classification 66

Table 33 Summary of Liquefiable Soil Depth 77

Table 34 Summary of Pile Capacity 80

REFERENCES

The following standards, publications and documents have been referred to in preparation of this report:

- **Bureau of Indian Standards (BIS)**
  IS 1893 (Part 1): 2016 – *Criteria for Earthquake Resistant Design of Structures*
- **Bureau of Indian Standards (BIS)**
  IS 2911 (Part 1/Sec 1): 2010 – *Design and Construction of Pile Foundations*
- **Bureau of Indian Standards (BIS)**
  IS 2131: 1981 – *Method for Standard Penetration Test for Soils*
- **Bureau of Indian Standards (BIS)**
  IS 2720 (Relevant Parts) – *Methods of Test for Soils*
- **Geological Survey of India (2020)**
  Geology and Mineral Resources of Uttar Pradesh, Miscellaneous Publication No. 30, Part XIII
- **Central Ground Water Board**
  Groundwater Information and Hydrogeological Reports of Uttar Pradesh / NCR Region
- **Project Drawings**
  General Arrangement Drawing – Plan and Profile from CH DN Line (NGNE-ALG-TED-STR-10001-R0)
- **Relevant Project Specifications and Tender Documents**
- **Seed, H.B. and Idriss, I.M. (1971)**
  Simplified Procedure for Evaluating Soil Liquefaction Potential
- **Youd, T.L. et al. (2001)**
  Liquefaction Resistance of Soils: Summary Report from NCEER Workshop

1 INTRODUCTION

1.1 Project Information

The **Noida Metro Rail Corporation Limited (NMRCL)** has undertaken the development of metro rail infrastructure to enhance urban mobility and support the rapidly growing transportation demands in Noida and its adjoining regions. As part of this initiative, NMRCL has proposed the extension of the existing Aqua Line corridor from Sector-142 to Botanical Garden, along with an additional corridor from the Depot Station to Boraki Multi-Modal Transport Hub (MMTH), covering a total length of approximately 14.16 km.

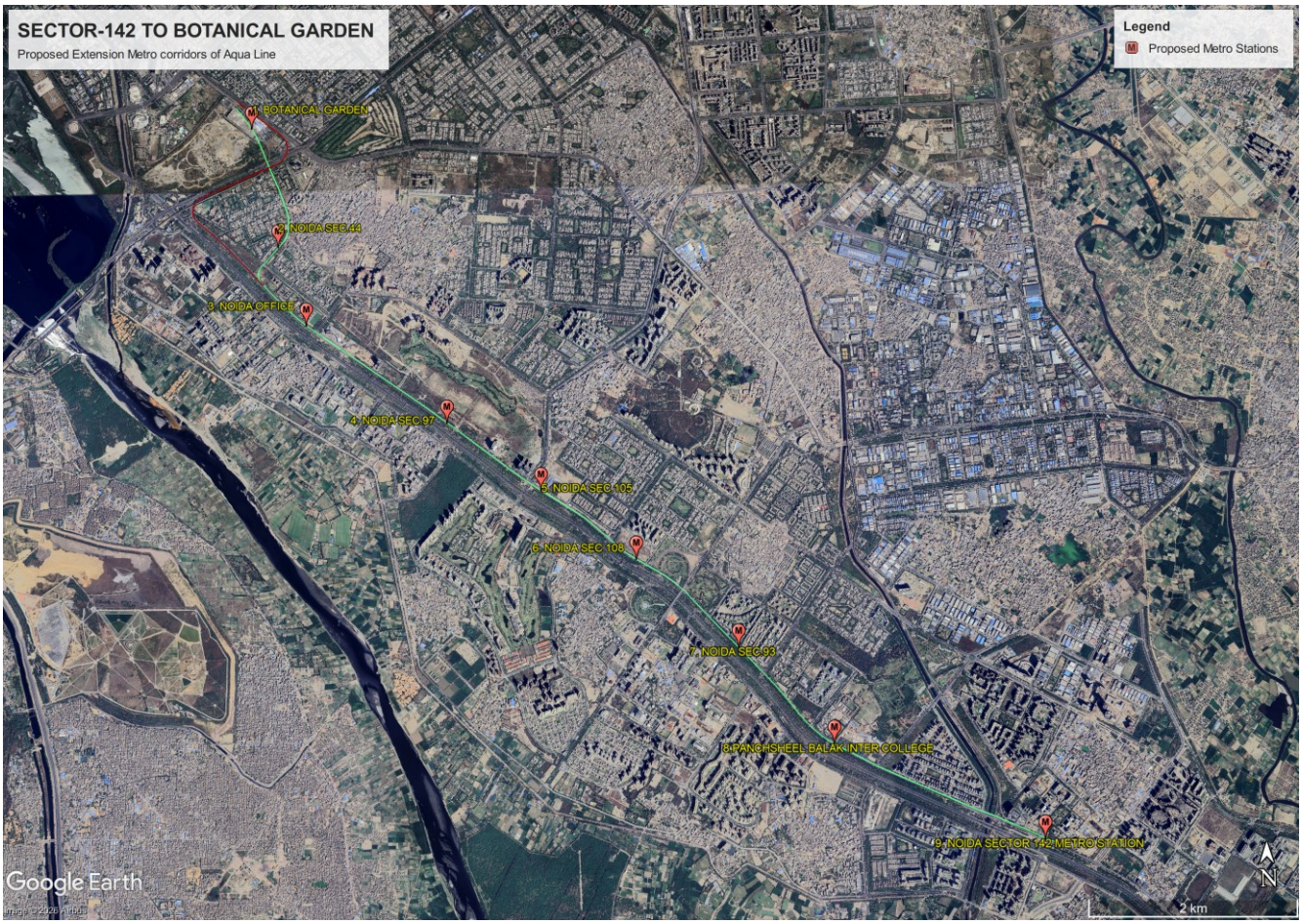


Figure 1 Proposed Alignment of Aqua Line from Sector-142 to Botanical Garden

The proposed extension is strategically planned to improve connectivity between key residential, commercial, and institutional areas, while also integrating with other modes of transportation. The Botanical Garden station serves as a major interchange node with the Delhi Metro network, thereby significantly enhancing regional connectivity. Similarly, the proposed Boraki MMTH is envisioned as a major transportation hub facilitating seamless integration of metro, rail, and road-based transit systems. The project is expected to reduce traffic congestion, minimize travel time, and promote sustainable and environmentally friendly public transportation.

The development of the metro corridor involves the construction of elevated viaducts, stations, entry/exit structures, and associated infrastructure such as depot facilities and utility corridors. These structures impose varying load conditions on the subsurface strata, necessitating a detailed understanding of the geotechnical characteristics of the soil and rock formations along the alignment. The performance and safety of such infrastructure are highly dependent on the engineering properties of the underlying ground, making geotechnical investigation a critical component of the project.

In this context, a comprehensive geotechnical investigation program has been carried out to evaluate the subsurface conditions along the proposed alignment. The scope of investigation includes drilling of boreholes at specified intervals and critical locations such as station areas, conducting in-situ tests like Standard Penetration Tests (SPT), collection of disturbed and undisturbed soil samples, and laboratory testing to determine index and engineering properties of soils. The investigation aims to establish subsurface stratification, assess the relative density and consistency of soil layers, evaluate shear strength and compressibility characteristics, and determine groundwater conditions.

The findings of the geotechnical investigation are utilized to develop design parameters for foundation systems, including pile and shallow foundations, and to assess settlement behavior, bearing capacity, and overall stability of structures. In addition, the study provides inputs for construction methodologies, ground improvement measures (if required), and quality control criteria during execution. Special attention is given to identifying potential geotechnical risks such as loose granular deposits, soft cohesive strata, and groundwater-related challenges that may influence the design and construction of the metro infrastructure.

This report presents the results of the geotechnical investigation carried out for the proposed extension corridors and provides recommendations for foundation design and construction considerations. The report is intended to serve as a technical reference for detailed design and execution of the project, in accordance with relevant Indian Standards and project-specific requirements.

1.2 Purpose of Study

The primary aim of this study is to conduct a geotechnical investigation at the site and formulate geotechnical recommendations essential for the design and construction of foundations for the proposed project and its related facilities.

To accomplish these purposes, the study is being conducted in the following phases,

- Mobilization of necessary equipment and personnel to carry out all the works and demobilization after completing the work.
- Drilling boreholes to specified depths, in order to evaluate the stratigraphy, and to collect rock/soil samples for laboratory testing.
- Conduct field tests as specified in the scope of work to evaluate relevant geotechnical parameters for subsequent analysis and design assessments.
- Analysing all field and laboratory data to develop geotechnical sub surface strata within project area.

The main goal of the subsurface (geotechnical) investigation is to:

- **Understand the type of soil and rock layers (sub-strata)** present beneath the site.
- **Assess the engineering properties** of these layers (such as strength, compressibility, etc.).
- **Evaluate whether these ground conditions are suitable** for safely supporting the proposed structure's foundation and substructure.
- **Ensure the ground can bear the expected loads** — including the weight of the structure, live loads (people, vehicles), and environmental forces (like wind or seismic).

1.3 Scope of Geotechnical Investigation

This report summarizes the geotechnical investigation and associated field and laboratory test results conducted for the proposed extension of the Aqua Line metro corridor from Sector-142 to Botanical Garden. The tests performed as part of the investigation are listed below:

Table 1 Summary of Geotechnical Investigation and Tests Conducted for Proposed project

Test	No. of Locations	Purpose / Remarks	Report Section Reference
Borehole Drilling	122 Nos.	• Performed to collect disturbed & undisturbed soil samples and log stratigraphy.	**Section 1.4 & Appendix C**
Groundwater Table Observation	In boreholes	• Depth to water table recorded during drilling and after 24 hours of stabilization.	**Section 1.4 & Appendix C**
Visual and Tactile Soil Classification	All borehole samples	• Field identification of soil type (SPT samples and undisturbed samples) in accordance with IS 1498. • Perform Field Permeability Test as per IS 5529.	**Section 1.4 & Appendix C & Appendix E**
Laboratory Testing of Soil Samples	As required	Includes • Sieve Analysis & Hydrometer test, • Bulk Density, Dry density and natural moisture content, • Specific Gravity of Soil Solid Test, • Liquid Limit & Plastic Limit test, • Consolidation Test, • Direct Shear Test, • Undrained Triaxial Compressive Strength, • Chemical Test (pH, Chloride & Sulphate), etc.	**Appendix C**

1.4 Regional Geology, History and Hydrology

1.4.1 Regional Geological Setting

The project corridor from Sector-142 to Botanical Garden, Noida, lies within the Indo-Gangetic alluvial plains and forms part of the Yamuna River basin. The area is geologically characterized by recent (Quaternary) alluvial deposits comprising predominantly sand, silt, clay, and occasional gravel/kankar.

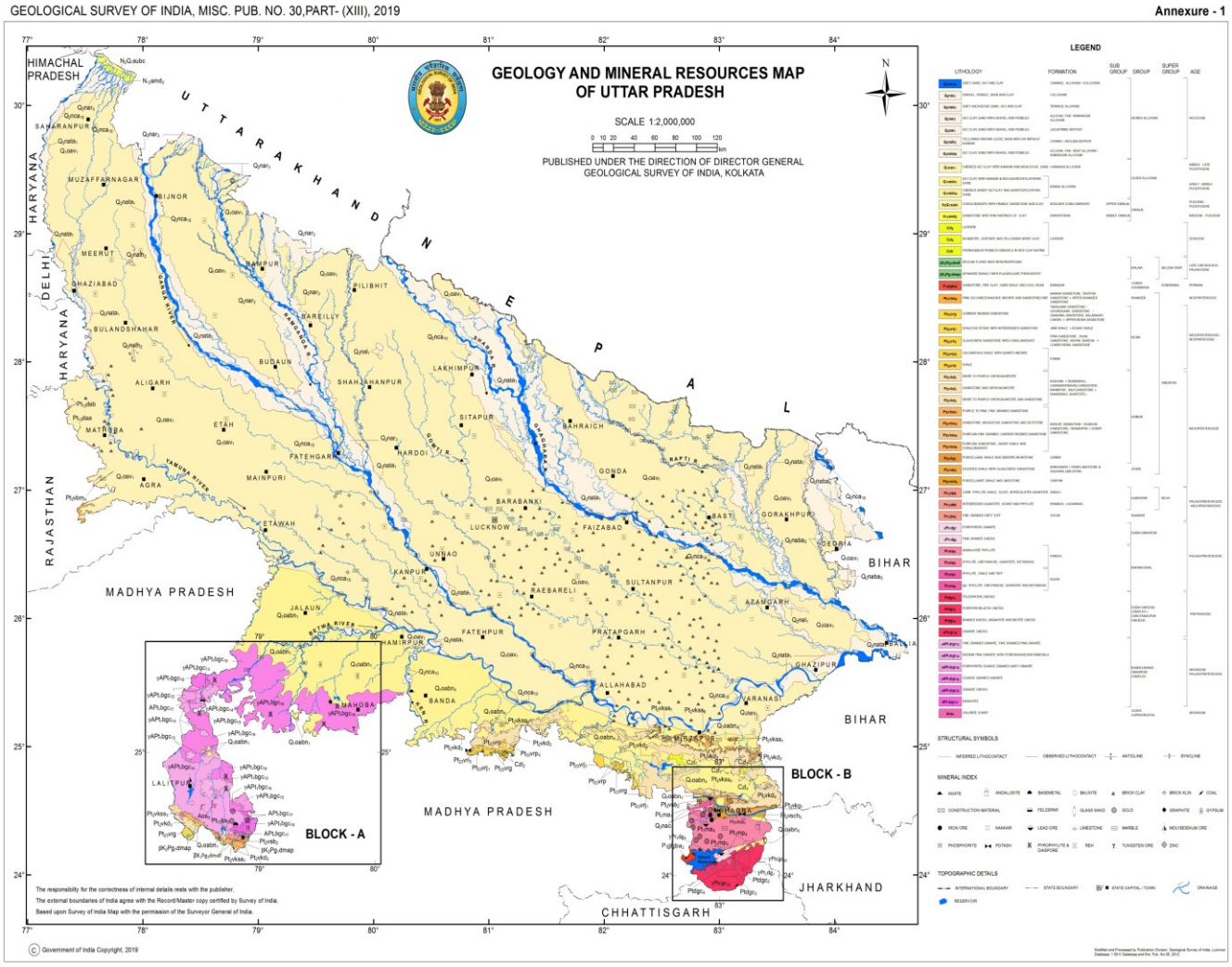


Figure 2 Geological Map of Uttar Pradesh (Geological Survey of India MISC. PUB. NO. 30,PART-(XIII), 2019

These alluvial deposits are of fluvial origin and have been transported and deposited by the Yamuna River and its tributaries over geological time. The deposits are generally unconsolidated to semi-consolidated and extend to considerable depths. The subsurface conditions are typically heterogeneous, with interlayering of silty sand (SM), silt (ML), and occasional clay (CL).

Based on regional geology, the area can be broadly classified into:

- **Newer Alluvium**: Found near active and old floodplains, consisting of loose to medium dense soils.
- **Older Alluvium:** Slightly compacted deposits with relatively higher density.

The rock formations of the Delhi Supergroup are known to exist at significant depths; however, these are not encountered within the scope of the present geotechnical investigation.

1.4.2 Geological Characteristics (Engineering Perspective)

The regional geological conditions indicate:

- **Predominance of** silty sand (SM) deposits
- **Occurrence of** inorganic silt (ML) layers **at varying depths**
- **Occasional presence of** clay (CL) layers
- **Gradual increase in density with depth**
- Thick deposits of unconsolidated alluvial soils

The area falls under **Seismic Zone IV** as per IS 1893, indicating a zone of high seismic risk. The alluvial nature of soils, combined with groundwater conditions, may influence seismic response and foundation behaviour.

1.4.3 Historical Development of Noida

Noida (New Okhla Industrial Development Authority) was established in 1976 under the Uttar Pradesh Industrial Area Development Act as a planned urban extension of Delhi within the National Capital Region (NCR).

The project corridor lies along the Noida Expressway, which has undergone rapid urbanization over the past two decades. The area has transitioned from predominantly agricultural land situated on the Yamuna floodplain to a highly developed urban corridor comprising residential, commercial, and institutional developments.

The Sector-142 to Botanical Garden stretch represents a major infrastructure corridor with metro connectivity, IT hubs, and high-density development, necessitating detailed geotechnical evaluation.

1.4.4 Hydrological Setting

a) Surface Water Regime

The project area falls within the Yamuna River basin. The Yamuna River is the primary drainage system controlling the regional hydrology, while the Hindon River acts as a secondary drainage channel in the vicinity.

The terrain is generally flat with a gentle slope, typical of alluvial plains, facilitating natural drainage towards the Yamuna River.

b) Rainfall Pattern

The average annual rainfall in the region is approximately **750–800 mm**, with the majority (about 85–90%) occurring during the monsoon season (June to September).

This seasonal rainfall plays a significant role in groundwater recharge and influences the fluctuation of the water table.

c) Groundwater Conditions

Groundwater in the region occurs under both phreatic (unconfined) and confined conditions within the alluvial deposits.

- **Typical depth to groundwater:** ~10 m to 15 m below ground level (bgl) **(subject to seasonal variation)**
- **Aquifer system:** Multi-layered, consisting of sand-dominated strata
- **Groundwater extraction:** Primarily through bore wells and tube wells

The presence of sandy strata facilitates good permeability, while interbedded silt and clay layers may locally influence seepage and water retention.

1.4.5 Hydrogeological Implications

Based on the regional geology and hydrology, the following implications are relevant:

- **Sandy strata provide** good drainage and permeability
- **Interlayered ML/CL soils may lead to** localized water retention or perched water conditions
- **Groundwater fluctuations may affect** excavation and construction activities
- Alluvial deposits in seismic zones may have **liquefaction susceptibility** under certain conditions

1.4.6 Summary

The project corridor is underlain by thick alluvial deposits dominated by silty sand with varying density and occasional cohesive interlayers. Groundwater conditions and stratigraphic variability are typical of the Yamuna floodplain environment.

Overall, the geological and hydrological conditions are consistent with the findings of the geotechnical investigation and are suitable for foundation design with appropriate considerations.

2 GROUND INVESTIGATION BY BOREHOLE DRILLING

The ground investigation includes borehole drilling through soil strata. All in-situ testing has been conducted in accordance with relevant IS codes and the specifications detailed below.

2.1 Soil Boring

Soil boring is a key subsurface investigation method carried out in accordance with IS 1892:2021 to determine the soil profile and collect representative samples for geotechnical evaluation. Boreholes, typically 150 mm in diameter, are advanced using rotary drilling with mud circulation through all types of soils except rock. During the boring process, disturbed soil samples are collected at every 1.5 m interval, and undisturbed samples are obtained at every 3.0 m interval for detailed laboratory testing. Standard Penetration Tests (SPT) are also performed at 1.5 m depth intervals, as per the specifications, to evaluate the in-situ strength and stratification of the soil layers. The results obtained from soil boring form the basis for foundation design and other geotechnical analyses.

A summary of borehole details, including borehole identification, coordinates (Lat, Long), ground level at borehole location, date of commencement and completion of drilling, and termination depth, is presented in the table below.

Table 2 Summary of Field Borehole Drilling Activities

BH ID	Chainage	Field Activity Dates		Borehole Location Coordinates		Ground Level of Borehole	Groundwater Level	Termination Depth
-	km	Start Date	End Date	Latitude	Longitude	MSL	Mtr	Mtr
BH-(-10)	0-372	10-03-2026	10-03-2026	28.565929	77.331639	199.70	14.50	30.00
BH-(-09)	0-224	11-03-2026	11-03-2026	28.565420	77.333116	195.00	13.00	30.00
BH-(-08)	0-174	12-03-2026	12-03-2026	28.564666	77.333096	195.40	13.65	30.00
BH-(-06)	0-015	09-03-2026	10-03-2026	28.562889	77.333568	198.20	13.50	30.00
BH-(-05)	0+094	14-03-2026	14-03-2026	28.563613	77.335658	200.20	13.26	30.00
BH-(-03)	0+344	14-03-2026	14-03-2026	28.562119	77.337383	197.70	13.50	30.00
BH-(-02)	0+499	12-03-2026	13-03-2026	28.560881	77.337345	203.30	13.20	30.00
BH-01	0+571	07-03-2026	08-03-2026	28.560611	77.336697	198.70	14.00	30.00
BH-02	0+674	07-03-2026	08-03-2026	28.560200	77.335759	198.80	14.50	30.00
BH-03	0+892	06-03-2026	06-03-2026	28.560014	77.333430	200.90	13.10	30.00
BH-04	0+996	07-03-2026	07-03-2026	28.559580	77.332488	200.70	13.00	30.00
BH-05	1+088	05-03-2026	05-03-2026	28.559277	77.331614	201.00	12.60	30.00
BH-06	1+192	03-03-2026	03-03-2026	28.558882	77.330645	200.10	13.20	30.00
BH-07	1+277	03-03-2026	03-03-2026	28.558487	77.329840	200.40	12.60	30.00
BH-08	1+388	02-03-2026	02-03-2026	28.558125	77.328853	200.30	13.20	30.00
BH-09	1+449	02-03-2026	02-03-2026	28.557891	77.328135	201.20	13.20	30.00
BH-11	1+610	01-03-2026	01-03-2026	28.556458	77.326750	201.70	13.20	30.00
BH-12	1+745	01-03-2026	01-03-2026	28.555003	77.327760	197.10	13.20	30.00
BH-13	1+859	28-02-2026	28-02-2026	28.554401	77.328564	201.00	13.60	30.00
BH-14	1+952	28-02-2026	28-02-2026	28.553737	77.329256	199.50	13.00	30.00

BH ID	Chainage	Field Activity Dates		Borehole Location Coordinates		Ground Level of Borehole	Groundwater Level	Termination Depth
-	km	Start Date	End Date	Latitude	Longitude	MSL	Mtr	Mtr
BH-15	2+035	27-02-2026	27-02-2026	28.553215	77.329835	201.70	13.10	30.00
BH-16	2+135	27-02-2026	27-02-2026	28.552657	77.330633	201.60	14.20	30.00
BH-17	2+230	26-02-2026	26-02-2026	28.551967	77.331234	193.60	14.10	30.00
BH-18*	2+567	02-02-2026	03-02-2026	28.551721	77.335913	198.10	16.00	30.00
BH-18A*	2+279	26-02-2026	26-02-2026	28.551999	77.331966	194.30	14.20	30.00
BH-19*	2+591	31-01-2026	01-02-2026	28.551209	77.335667	195.80	15.10	30.00
BH-19A*	2+420	25-02-2026	25-02-2026	28.550782	77.332610	201.20	13.20	30.00
BH-20*	2+541	31-01-2026	01-02-2026	28.550972	77.334642	197.80	-	27.50
BH-20A*	2+514	25-02-2026	25-02-2026	28.550137	77.333238	198.30	13.90	30.00
BH-21	2+605	29-01-2026	29-01-2026	28.549567	77.333912	199.50	14.50	30.00
BH-22	2+719	27-01-2026	28-01-2026	28.548860	77.334756	197.70	15.20	30.00
BH-23	2+823	25-01-2026	25-01-2026	28.548172	77.335483	196.80	14.00	30.00
BH-24	2+920	25-01-2026	25-01-2026	28.547539	77.336169	201.40	15.20	30.00
BH-25	3+033	27-01-2026	28-01-2026	28.546816	77.336989	199.80	16.00	30.00
BH-26	3+122	24-01-2026	24-01-2026	28.546240	77.337649	202.00	11.50	30.00
BH-27	3+205	29-01-2026	30-01-2026	28.545705	77.338270	197.40	14.30	30.00
BH-28	3+304	29-01-2026	30-01-2026	28.545145	77.339078	200.70	13.10	30.00
BH-28A**	3+367	29-01-2026	30-01-2026	28.544812	77.339591	201.20	15.70	30.00
BH-29	3+391	27-01-2026	28-01-2026	28.544630	77.339750	200.50	14.60	30.00
BH-30	3+514	24-01-2026	25-01-2026	28.544025	77.340743	200.50	14.55	30.00
BH-31	3+643	24-01-2026	25-01-2026	28.543360	77.341892	198.20	16.10	30.00
BH-32	3+730	27-01-2026	29-01-2026	28.542894	77.342602	199.40	14.60	30.00
BH-33	3+792	19-01-2026	22-01-2026	28.543081	77.343537	201.60	13.20	30.00
BH-34	3+883	20-01-2026	24-01-2026	28.542715	77.344385	203.50	14.65	30.00
BH-35	4+014	17-01-2026	18-01-2026	28.542085	77.345346	201.60	14.00	30.00
BH-36	4+093	14-01-2026	15-01-2026	28.541566	77.346066	203.00	14.20	35.00
BH-37	4+210	12-01-2026	13-01-2026	28.541026	77.347098	196.90	14.30	35.00
BH-38	4+334	08-01-2026	09-01-2026	28.540361	77.348116	195.20	13.75	35.00
BH-39	4+425	10-01-2026	12-01-2026	28.539847	77.348843	196.20	15.00	35.00
BH-40	4+518	14-01-2026	16-01-2026	28.539304	77.349580	199.00	13.70	35.00
BH-41	4+617	12-01-2026	13-01-2026	28.538807	77.350420	198.20	14.69	35.00
BH-42	4+751	10-01-2026	11-01-2026	28.538135	77.351558	198.40	13.70	35.00
BH-43	4+833	12-01-2026	13-01-2026	28.537904	77.352401	202.80	14.00	35.00
BH-44	4+910	10-01-2026	11-01-2026	28.537169	77.352776	200.80	13.85	35.00
BH-45	5+030	14-01-2026	15-01-2026	28.536120	77.353412	201.30	13.10	35.00
BH-45A**	5+080	30-01-2026	30-01-2026	28.535918	77.353887	203.00	13.00	30.00
BH-46	5+122	15-01-2026	16-01-2026	28.535689	77.354230	200.40	12.90	35.00
BH-48	5+393	08-01-2026	09-01-2026	28.534638	77.356794	203.60	13.20	35.00
BH-49	5+442	06-01-2026	07-01-2026	28.534481	77.357320	202.90	13.30	35.00
BH-50	5+532	06-01-2026	07-01-2026	28.533921	77.357970	203.10	14.20	35.00
BH-51	5+596	16-01-2026	17-01-2026	28.532961	77.357941	198.10	14.00	35.00
BH-52	5+718	03-01-2026	05-01-2026	28.532840	77.359405	200.10	14.00	35.00
BH-53	5+830	01-01-2026	02-01-2026	28.531863	77.360548	198.80	14.40	35.00

BH ID	Chainage	Field Activity Dates		Borehole Location Coordinates		Ground Level of Borehole	Groundwater Level	Termination Depth
-	km	Start Date	End Date	Latitude	Longitude	MSL	Mtr	Mtr
BH-54	5+939	18-01-2026	19-01-2026	28.531160	77.360807	199.10	12.85	30.00
BH-55	6+004	17-01-2026	18-01-2026	28.530761	77.361301	199.90	12.60	30.00
BH-56	6+182	01-02-2026	01-02-2026	28.529909	77.362867	201.00	12.60	30.00
BH-57	6+246	03-01-2026	04-01-2026	28.532783	77.359539	196.20	12.60	35.00
BH-58	6+323	01-01-2026	02-01-2026	28.530069	77.363860	200.00	12.60	35.00
BH-59	6+429	30-12-2025	31-12-2025	28.529259	77.365404	198.50	12.60	35.00
BH-60	6+488	28-12-2025	30-12-2025	28.528927	77.365871	195.30	12.60	35.00
BH-61	6+639	26-12-2025	27-12-2025	28.528102	77.367108	198.00	8.35	35.00
BH-62	6+726	25-12-2025	28-12-2025	28.527716	77.367898	198.40	8.00	35.00
BH-63	6+838	22-12-2025	25-12-2025	28.527113	77.368842	200.10	8.70	35.00
BH-64	6+925	20-12-2025	21-12-2025	28.526529	77.369440	199.00	8.50	35.00
BH-65	6+998	18-12-2025	20-12-2025	28.526125	77.370037	202.00	8.50	35.00
BH-66	7+129	17-12-2025	18-12-2025	28.525359	77.371067	194.50	9.10	30.00
BH-67	7+220	16-12-2025	16-12-2025	28.524783	77.371694	196.80	8.50	30.00
BH-68	7+268	15-12-2025	15-12-2025	28.524257	77.372608	197.60	8.50	30.00
BH-69	7+329	14-12-2025	14-12-2025	28.523814	77.373588	195.70	9.10	30.00
BH-69A**	7+392	12-12-2025	13-12-2025	28.523991	77.373170	195.10	8.50	30.00
BH-69B**	7+369	31-01-2026	31-01-2026	28.523549	77.372605	198.90	12.00	30.00
BH-70	7+487	01-01-2026	01-01-2026	28.522955	77.373615	192.70	9.00	30.00
BH-71	7+629	05-02-2026	05-02-2026	28.522513	77.375002	195.00	12.50	30.00
BH-72	7+728	02-02-2026	02-02-2026	28.521955	77.375766	197.20	14.00	30.00
BH-73	7+837	03-01-2026	03-01-2026	28.521316	77.376552	202.40	13.20	30.00
BH-74	7+912	06-02-2026	06-02-2026	28.520944	77.377201	199.60	11.00	30.00
BH-75	8+031	04-02-2026	06-02-2026	28.520095	77.377923	197.80	12.00	30.00
BH-76	8+069	20-02-2026	20-02-2026	28.519788	77.378103	195.60	14.10	30.00
BH-77	8+226	04-02-2026	05-02-2026	28.51886	77.379333	196.90	12.40	30.00
BH-80	8+551	19-02-2026	20-02-2026	28.516652	77.381522	200.20	13.60	30.00
BH-82	8+859	08-02-2026	08-02-2026	28.514671	77.383726	196.80	13.45	30.00
BH-83	8+793	07-02-2026	07-02-2026	28.515116	77.383277	192.70	13.20	30.00
BH-84	8+939	08-02-2026	08-02-2026	28.514115	77.384243	195.80	16.00	30.00
BH-85	9+024	09-02-2026	10-02-2026	28.513565	77.384855	196.90	13.20	30.00
BH-86	9+115	09-02-2026	09-02-2026	28.513007	77.38554	198.10	14.95	30.00
BH-87	9+244	11-02-2026	11-02-2026	28.51211	77.386349	200.50	14.00	30.00
BH-88	9+346	12-02-2026	12-02-2026	28.511386	77.386971	198.90	15.00	30.00
BH-89	9+428	11-02-2026	11-02-2026	28.510849	77.387532	200.60	13.40	30.00
BH-91	9+626	10-02-2026	10-02-2026	28.509492	77.388878	196.30	13.10	30.00
BH-92	9+737	12-02-2026	12-02-2026	28.5087	77.389642	191.80	12.85	30.00
BH-93	9+820	13-02-2026	13-02-2026	28.50822	77.390342	196.50	14.20	30.00
BH-95	10+044	13-02-2026	13-02-2026	28.507002	77.392273	200.30	13.20	30.00
BH-96	10+125	14-02-2026	14-02-2026	28.50664	77.393	200.90	12.90	30.00
BH-97	10+222	14-02-2026	14-02-2026	28.506187	77.393852	198.00	13.50	30.00
BH-98	10+328	15-02-2026	15-02-2026	28.505758	77.394825	194.40	13.20	30.00
BH-99	10+428	15-02-2026	15-02-2026	28.505376	77.395746	200.40	13.40	30.00

BH ID	Chainage	Field Activity Dates		Borehole Location Coordinates		Ground Level of Borehole	Groundwater Level	Termination Depth
-	km	Start Date	End Date	Latitude	Longitude	MSL	Mtr	Mtr
BH-100	10+542	16-02-2026	16-02-2026	28.504972	77.396855	194.20	13.80	30.00
BH-101	10+631	16-02-2026	16-02-2026	28.504602	77.3976620	199.60	13.20	30.00
BH-102	10+709	17-02-2026	17-02-2026	28.504370	77.3984100	200.20	12.85	30.00
BH-103	10+821	17-02-2026	17-02-2026	28.503981	77.3994680	199.40	13.00	30.00
BH-104	10+946	17-02-2026	18-02-2026	28.503297	77.4005230	196.50	14.00	30.00
BH-105	11+034	17-02-2026	18-02-2026	28.503094	77.4014020	195.20	13.20	30.00
BH-106	11+134	18-02-2026	19-02-2026	28.502883	77.4024140	198.00	12.90	30.00
BH-107	11+240	18-02-2026	18-02-2026	28.502387	77.4032400	195.90	12.65	30.00
BH-108	11+329	19-02-2026	19-02-2026	28.502482	77.4030630	195.60	14.20	30.00
BH-109	11+400	19-02-2026	20-02-2026	28.501817	77.4047940	196.50	12.00	30.00
BH-111	11+609	20-02-2026	20-02-2026	28.501663	77.406922	199.10	14.00	30.00
BH-112	11+760	24-02-2026	24-02-2026	28.501437	77.40844	199.10	14.10	30.00
BH-113	11+835	23-02-2026	24-02-2026	28.500388	77.408836	197.50	13.20	30.00
BH-114	11+943	23-02-2026	23-02-2026	28.499986	77.40985	196.10	-	30.00
BH-115	12+051	22-02-2026	22-02-2026	28.500022	77.411071	196.30	14.20	30.00
BH-116	12+130	22-02-2026	22-02-2026	28.499683	77.411947	195.20	-	30.00

Note:

- The chainages of the boreholes have been derived by plotting the drilled borehole locations with reference to the submitted drawing titled **"General Arrangement Drawing – Plan and Profile from CH DN Line (NGNE-ALG-TED-STR-10001-R0)**
- BH-18, BH-19, and BH-20 were drilled at their respective chainages along the initially proposed alignment, whereas BH-18A, BH-19A, and BH-20A were drilled at the corresponding chainages along the revised alignment.
- **Marked boreholes have been drilled at locations corresponding to the proposed station entry and exit structures.

The geological plan and profile illustrating borehole locations and the probable stratigraphy between boreholes are presented in **Appendix G** of this report. The interpreted stratification between boreholes has been developed based on the lithological observations recorded in the boreholes and the strata encountered during the drilling investigations. However, the subsurface conditions may vary locally, and the actual stratigraphy at site may differ from the interpreted profile.

2.1.1 Disturbed and Undisturbed Sample Collection

Undisturbed Samples Undisturbed soil samples in 100mm Ø Shelby tubes were collected in the thin-walled sampling tubes in accordance with IS:2132-1986 at regular interval for finding shear parameters, field density, moisture content etc. of soil. The sampling tube was connected to the rod by jarring link in case of 100mm Ø tubes. 'A' drill rods were connected by suitable adaptor with ball check value. Before lowering the sampler, the borehole was properly cleaned. Sampling tube was pushed into the borehole by pressure hammering as per the soil stiffness. The sampling tubes were waxed immediately after removal.



Figure 3 Thin Wall Shelby Tube Sampler



Figure 4 Split Spoon Sampler (SPT)

In case of medium to coarse grained, non-cohesive sand samples, where sampling is unsuccessful, Standard Penetration Tests was carried out after cleaning the borehole. However, **Disturbed Samples** from shell or split spoon samplers were also collected in polythene bags with proper levels during drilling for finding index properties of the soil.

Details of boring with soil/rock profile, SPT values along with sampling details are given in the respective bore logs in the appendix of the report.

In case of medium to coarse grained, non-cohesive sand or highly weathered rock where core recovery not possible where sampling is unsuccessful, disturbed sample was taken from the cleaning the borehole. Disturbed samples were also collected in polythene bags with proper labels during drilling for finding index properties of the samples.

2.1.2 Standard Penetration Test: (SPT)

The standard penetration tests were performed in accordance with IS: 2131:1981. The test was carried out by using standard split spoon sampler connected to 'A' road and driving by 45cm using 63.5kg hammer freely dropped from 75cm.

Before testing, the borehole was cleaned properly and Split spoon sampler was centrally seated in the borehole. In case of SPT to be conducted below water table, care was taken to keep casing position above the borehole depth. The water level in borehole is maintained above or at least at the water table.

SPT 'N'-Values are described as below.

- The number of blows for each 15cm of penetration of the split spoon sampler is recorded.
- The blows required to penetrate the initial 15cm of the split spoon for seating the sampler is ignored due to the possible presence of loose materials or cuttings from the drilling operation.
- The cumulative number of blows required to penetrate the balance 30cm of the 45cm split spoon sampler is termed the SPT value or the 'N' value. For example, a SPT value reported as "20" means that 20 blows were imparted to penetrate the split spoon sampler by the last 30 cm.
- Where the number of blows required to penetrate the balance 30 cm of the split spoon sampler exceeds 100, the number of blows is presented along with the corresponding penetration. For example, an SPT value reported as "101 / 5 cm" means that 101 blows were imparted to penetrate the split spoon sampler by 5 cm after the first 15 cm initial (seating) penetration.
- Where refusal (N>100) to further penetration of the split spoon sampler is encountered in the first 15 cm of seating penetration itself, SPT test could not be completed and "Ref" is indicated in the bore logs, along with the penetration achieved. For example, an SPT value reported as "Ref / 5 cm" means that more than 100 blows were imparted to penetrate the split spoon sampler by a total of 5 cm only, and the 15 cm seating penetration could not be achieved.

SPT 'N' values are correlated in the Table 3 below with the relative density of granular strata (sandy strata) and the consistency of cohesive strata, as referenced in BS 5930 (1999).

Table 3 SPT 'N" Value Correlation with Relative Density and Consistency

Correlation for Clay/Plastic Silt		**Correlation for Sand/Non-Plastic Silt**	
Consistency of Clays	**Penetration Value (Blows)**	**Relative Density of Sand**	**Penetration Value (Blows)**
Very Soft	0 to 2	Very Loose	0 to 4
Soft	3 to 4	Loose	5 to 10
Medium Stiff	5 to 8	Medium	11 to 30
Stiff	9 to 16	Dense	31 to 50
Very Stiff	17 to 32	Very Dense	Above 50
Hard	Above 32	-	-

2.2 Additional In-Situ Field Testing

A brief methodology for test is outlined in the subsections, while detailed evaluations and results are provided in the relevant annexures of this report.

2.2.1 Field Permeability Test

The field permeability test by falling head method, as per Clause 3.3 of IS 5529 (Part 1): 2013, is conducted by first drilling the borehole to the required depth and thoroughly cleaning it to remove loose cuttings and debris.

A suitable permeameter casing is then installed, ensuring proper sealing around the test section to prevent leakage. The borehole is filled with clean water and allowed to stand until the surrounding soil becomes fully saturated. The coefficient of permeability is then calculated using the relevant formula specified in the code, considering borehole size and test section length.

$$K = \left(d^2/(8L)\right)\log_e(L/R)\left(\log_e(h_1/h_2)/(t_2 - t_1)\right)$$

Where,

K = coefficient of permeability;

d = diameter of intake pipe (stand pipe);

L = length of test zone;

h_1 = head of water in the stand pipe at time (t_1, above piezometeric surface;)

h_2 = head of water in the stand pipe at the time (t_2, above piezometeric surface)

R = radius of hole.

After completion, the casing is removed if required, the borehole is backfilled, and all observations and results are documented.

3 LABORATORY TESTING

Laboratory testing was conducted in our NABL-accredited facility**,** adhering to the quality management system in compliance with ISO/IEC 17025:2017 standards. Selected soil, groundwater and rock samples were subjected to laboratory tests to determine their physical and engineering properties. All testing procedures strictly followed the relevant Indian Standard (IS) codes, ensuring accuracy, reliability, and consistency in the results.

Tests were conducted on selected soil and groundwater samples obtained from the boreholes, as summarized in Table 4 below.

Table 4 Laboratory Tests and Relevant IS Standard of Test

Laboratory Test	IS Code Referred
Soil	
Bulk Density	By calculations
Natural Moisture Content	IS 2720 (Part-2): 1973
Specific Gravity	IS 2720 (Part-3): 1980
Grain Size Analysis & Hydrometer	IS 2720 (Part-4): 1985
Liquid Limit and Plastic Limit	IS 2720 (Part-5): 1985
Direct Shear Test	IS 2720 (Part-13): 1986
Consolidation Test	IS 2720 (Part 15): 1986
Triaxial Compression Test	IS 2720 (Part 11): 1993
Chemical	
Chemical Test of Groundwater	IS 3025 Relevant Part
Chemical Test of Soil Sample	IS 2720 Relevant Part

3.1 Laboratory Testing of Soil Sample

3.1.1 Grain Size Analysis

Testing procedure generally confirms to IS: 2720 (Part 4) - 1985. Both sieve analysis and hydrometer analysis has been carried out. Sieve Analysis: Sieve analysis for coarser fractions has been done by dry sieving, while wet sieving method has been followed for soil fractions with appreciable amount of clay. Sieving has been done using a sieve shaker by passing through the following IS sieves. 4.75mm, 2.36 mm, 1.70 mm, 1.40 mm, 1.00 mm, 600 microns, 425 microns, 100 microns and 75 microns.

3.1.2 Atterberg's Limits

Liquid Limit: Testing is done as per IS: 2720 (Part 5) - 1985. About 200gm of soil sample passing through 425 microns IS sieve is mixed thoroughly with distilled water on the flat glass to form a uniform paste. The paste generally has a consistency that will require 30 to 35 drops of the cup to cause the required closure of standard groove. The ready-mix soil is placed in the Casagrande cup in such a way to form a depth of 1cm at the centre of the cup and then central groove of 12mm is made using standard grooving tool. The cup is fitted and dropped by turning the crank at the rate of 2 revolutions per second until the two halves of the soil close. The number of drops required to make the groove close for the length of 12mm is recorded. A portion of the sample is then taken out for water content determination and the water content corresponding to 25 blows represents the liquid limit.

Plastic Limit: About 15gms of oven dried soil passing through 425 microns' sieve is mixed with sufficient quantity of water such that the soil mass becomes plastic enough to be easily shaped into a ball. A portion of this ball is rolled on a glass plate with the palm of the hand into a thread of uniform dia of 3 mm. The water content represents the plastic limit.

3.1.3 Natural Moisture Content

A moisture cup is loosely filled with soil and weighed with lid. It is then kept in oven with lid removed and maintained at temperature of the oven at 110 ± 5°C for 24 hours. The lid of the container is replaced and the dry weight found out. The percentage of water content shall be calculated using the formula.

$$W = \frac{W_2 - W_3}{W_3 - W_1} \text{x } 100$$

Where,

W = Water content in %,

W_2 = Weight of container with lid with wet soil in g,

W_3 = Weight of container with lid with dry soil in g,

W_1 = Weight of container with lid in g.

3.1.4 Bulk and Dry Density

Test procedure shall be as per IS: 2720 (Part 7) - 1987. The unit weight of soil in g/cc is its weight per unit volume. Soil is filled in container and its weight determined. Knowing the volume of container, the ratio of weight to volume represents bulk density. The soil is then oven dried and weighed and dry density yd(g/cc) is computed using formula.

$$Y_d = \frac{Y_b}{(1+W)}$$

Where,

Y_d= Dry density in g/cc,

Y_b = Bulk density in g/cc,

W = Natural moisture content in %.

3.1.5 Specific Gravity

Test procedure shall be as per IS: 2720 (Part 3/Section 1) - 1987 for fine-grained soils. The specific gravity of soil solids can be defined as the weight of given volume of soil particles to the weight of equal volume of distilled water. This term is used in relating weight of soil to its volume. Specific gravity is found out using standard specific gravity bottle of 50 ml capacity by weighing empty bottle (W_1), bottle + dry soil (W_2), bottle + dry soil + water (W_3), bottle + water (W_4).

$$G = \frac{(W_2 - W_1)}{((W_2 - W_1) - (W_3 - W_4))}$$

Where,

G = Specific gravity of the soil solid,

W_1 = Weight of density bottle in g,

W_2 = Weight of bottle and dry soil in g,

W_3 = Weight of bottle, soil and water in g,

W_4 = Weight of bottle when full of water only in g.

3.1.6 Direct Shear Test

Test procedure shall be as per IS: 2720 (Part 13) - 1986. In this test the soil specimen is confined in a square metal box split into two halves horizontally. Perforated metal plates and pores stones are placed above and below the specimen to allow free drainage. After applying vertical load, the soil is gradually sheared by applying horizontal force, which makes the two halves of the box move relative to each other. The shear is applied at a constant strain rate and measured in a proving ring. Vertical deformation is measured with dial gauge. Minimum of three specimens are tested and the graph drawn with normal stress in 'X' axis and shear stress in 'Y' axis. From the straight-line plot, values of *c* and ϕ are measured.

3.1.7 Consolidation Test

The One-Dimensional Consolidation Test is conducted as per IS 2720 (Part 15): 1986 to determine the rate and magnitude of consolidation of soil under controlled loading conditions. A representative undisturbed or remoulded soil sample is placed in a consolidometer ring, ensuring minimal disturbance. The sample is saturated and positioned between porous stones within a rigid loading frame to allow vertical drainage. An initial seating load is applied, followed by successive increments of load, typically following a logarithmic sequence, and each load is maintained until primary consolidation is deemed complete (determined by dial gauge readings). The settlement of the specimen is recorded over time using a dial gauge or electronic displacement sensor. The coefficient of consolidation (C_v) and compression index (C_c) are calculated from the data, which helps in predicting settlement behaviour of soil under field conditions.

3.1.8 Triaxial Compression Test

The triaxial compression test is used to determine the shear strength parameters of soil under controlled drainage and confining pressure conditions. A cylindrical soil specimen, usually 38 mm in diameter and 76 mm in height, is enclosed in a rubber membrane and placed inside a triaxial cell. The sample is first saturated using back pressure techniques to ensure full saturation, confirmed by achieving a Skempton's B-value close to 1.0. Once saturated, the specimen is consolidated under a predetermined confining pressure, and volume changes are monitored until consolidation is complete. After consolidation, the specimen is sheared by applying axial stress at a constant rate of strain (commonly 0.5–2% per minute). Depending on the drainage conditions during the test, it can be performed as unconsolidated undrained (UU), consolidated undrained (CU), or consolidated drained (CD). In the CU test, pore water pressures are measured to allow for the determination of effective stress parameters. During shearing, axial load, deformation, and pore pressures are recorded to develop stress-strain curves and plot Mohr's circles, from which the cohesion and angle of internal friction of the soil are determined.

4 SUBSURFACE STRATIGRAPHY AND GEOTECHNICAL PROPERTIES OF SOIL

Subsurface profiles have been developed based on the analysis of samples collected from the exploratory boreholes and the corresponding laboratory test results. The average parameters of each stratum, as determined from laboratory testing, are presented strata-wise.

The average soil properties for each stratum, representative of the investigated area, are summarized below. Additionally, the results of the Standard Penetration Tests (SPT) conducted within each identifiable layer have been documented, with the “N” values presented in the borehole logs.

4.1 Subsurface Stratification

The subsurface stratification along the proposed alignment has been established based on the interpretation of borehole data obtained from the geotechnical investigation carried out at various locations along the corridor.

The boreholes have been planned and executed along the alignment at regular intervals, and the stratification has been interpreted considering the borehole locations with respect to the corresponding chainages. The classification of soil strata has been carried out based on field observations during drilling, in-situ test results, and laboratory test data.

Based on the analysis of lithological logs of individual boreholes, the subsurface profile has been generalized by grouping boreholes exhibiting similar stratification patterns and soil characteristics. Accordingly, the entire alignment has been divided into different zones-based borehole locations and corresponding chainages.

Table 5 presents the zone-wise summary of subsurface conditions along the alignment based on borehole locations and chainage.

Table 5 Summary of Zone Divided for Stratification

Section	Zone	Chainage (km)	Boreholes	Predominant Soil	Intermediate Layer (≈5–20 m)	Deep Layer (>20 m)
4.1.1	Zone 1	0-380 to 0+500	BH-(-02) to BH-(-10)	SM	Dense SM with local ML	Very Dense SM
4.1.2	Zone 2	0+500 to 1+450	BH-01 to BH-09	SM	Medium Dense to Dense SM	Very Dense SM
4.1.3	Zone 3	1+450 to 2+515	BH-11 to BH-20A	SM + ML	Interlayered SM & ML	Very Dense SM
4.1.4	Zone 4	2+515 to 3+515	BH-21 to BH-30	ML Dominant	Thick ML layer	SM + ML mixed
4.1.5	Zone 5	3+515 to 4+520	BH-31 to BH-40	SM + ML	Mostly SM, local ML	Very Dense SM
4.1.6	Zone 6	4+520 to 5+000	BH-41 to BH-50	SM	Dense SM	Very Dense SM

Section	Zone	Chainage (km)	Boreholes	Predominant Soil	Intermediate Layer (≈5–20 m)	Deep Layer (>20 m)
4.1.7	Zone 7	5+000 to 6+000	BH-51 to BH-60	SM + ML	Strong interlayering	SM with ML
4.1.8	Zone 8	6+000 to 7+000	BH-61 to BH-70	ML + SM	Continuous ML layer	Mixed SM & ML
4.1.9	Zone 9	7+000 to 8+000	BH-71 to BH-80	SM + ML	Dense SM, local ML	Very Dense SM
4.1.10	Zone 10	8+000 to 9+000	BH-82 to BH-89	SM	Dense SM	Very Dense SM
4.1.11	Zone 11	9+000 to 10+000	BH-91 to BH-100	SM + ML	SM with ML interlayers	Very Dense SM
4.1.12	Zone 12	10+000 to 11+000	BH-101 to BH-109	SM + ML + CL	SM with ML & local CL	Very Dense SM
4.1.13	Zone 13	11+000 to 12+130	BH-111 to BH-116	SM + ML	Multiple ML layers	SM with ML

The subsurface profile is predominantly characterized by alluvial deposits comprising silty sand (SM) with varying density, interbedded with inorganic silt (ML) and occasional clay (CL) layers. Variability in stratification is mainly observed within the intermediate depth range, whereas the deeper strata generally consist of very dense silty sand forming a competent bearing layer.

For ease of interpretation and comparison, a consolidated zone-wise summary based on borehole data and chainage is presented in subsection 4.1.1 to 4.1.13, highlighting the predominant soil type and stratification characteristics.

4.1.1 Zone 1: CH: 0-380 km to 0+500 km (BH-(-02) to BH-(-09))

The subsurface conditions in this stretch are predominantly characterized by alluvial silty sand (SM) deposits. A thin topsoil layer is followed by loose to medium dense silty sand at shallow depths. The intermediate strata (≈5–15 m) comprise medium dense to dense silty sand with occasional gravel.

Localized inorganic silt (ML) layers are observed in BH-(-06) and BH-(-08); however, these are discontinuous. The deeper strata (>15 m) consist of dense to very dense silty sand extending up to 30.50 m, forming a competent bearing layer.

Table 6 Subsurface Stratification (BH-(-02) to BH-(-09))

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Loose	0.75	5.25 – 7.00	3.50 – 6.25	All Boreholes
Silty Sand (SM)	Medium Dense	5.25 – 7.00	10.00 – 12.25	Variable	All Boreholes
Silty Sand (SM)	Dense	10.00 – 12.25	16.00 – 20.25	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	14.25 – 20.25	21.25 – 30.50	Variable	Majority Boreholes
Silty Sand (SM)	Very Dense (with Gravel)	16.00 – 21.25	30.50	8.00 – 14.00	All Boreholes
Inorganic Silt (ML)	Near-surface layer	0.75	4.00	~3.25	BH-(-06), BH-(-08)
Inorganic Silt (ML)	Intermediate layer	11.25 – 12.25	14.25 – 15.25	~3.00	BH-(-06), BH-(-08)

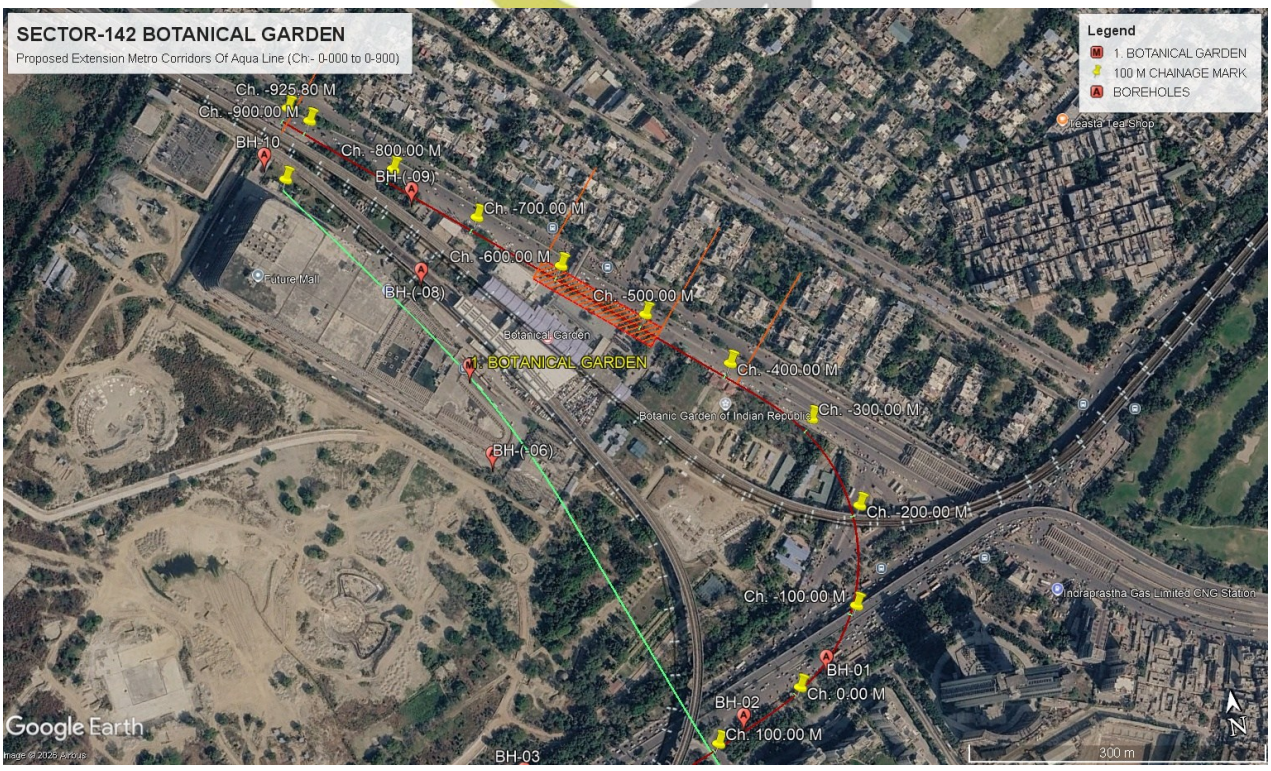


Figure 5 Borehole Location Sector 142 to Botanical Garden (CH: 0-380 km to 0+500 km)

4.1.2 Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09)

The subsurface conditions within this stretch are predominantly characterized by alluvial deposits comprising silty sand (SM) strata. A thin layer of topsoil is encountered at the surface, underlain by medium dense silty sand extending to shallow depths. With increasing depth, the soil strata gradually transition to dense and very dense silty sand.

The intermediate strata (≈5 m to 15 m) consist of medium dense to dense silty sand with occasional gravel. The deeper strata (>15 m) comprise very dense silty sand extending up to the explored depth.

Table 7 Subsurface Stratification (BH-01 to BH-09)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Medium Dense, greyish fine-grained	0.75	4.00 – 10.00	3.25 – 9.25	All Boreholes
Silty Sand (SM)	Medium Dense to Dense, with gravel	4.00 – 7.00	10.00 – 18.25	Variable	Majority
Silty Sand (SM)	Dense	10.00 – 12.25	15.25 – 21.25	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	15.25 – 18.25	21.25 – 24.25	Variable	All Boreholes
Silty Sand (SM)	Very Dense with gravel	20.25 – 24.25	30.50	6.25 – 10.25	All Boreholes
Inorganic Silt (ML)	Hard, low plasticity	14.25 – 15.25	17.25 – 21.25	~3 – 6	Few Boreholes (BH-02, 05, 07)



Figure 6 Borehole Location Sector 142 to Botanical Garden (CH: 0+500 km to 1+450 km)

4.1.3 Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A)

This stretch exhibits interlayered subsurface conditions comprising silty sand (SM) and inorganic silt (ML). The topsoil is followed by medium dense silty sand; however, ML layers are encountered at varying depths.

The intermediate strata show frequent SM–ML interbedding, while deeper strata predominantly consist of very dense silty sand.

Table 8 Subsurface Stratification (BH-11 to BH-20A)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Loose to Medium Dense, with / without gravel	0.75	4.00 – 10.00	3.25 – 9.25	Majority
Silty Sand (SM)	Medium Dense	4.00 – 11.25	9.25 – 16.00	Variable	All Boreholes
Silty Sand (SM)	Dense	8.25 – 12.25	15.25 – 17.25	Variable	Majority
Silty Sand (SM)	Dense to Very Dense	10.00 – 15.25	17.25 – 21.25	Variable	All Boreholes
Silty Sand (SM)	Very Dense with/without gravel	15.25 – 22.00	28.00 – 30.50	6.25 – 12.00	All Boreholes
Inorganic Silt (ML)	Medium Stiff to Hard	0.75 – 6.25	5.25 – 26.25	3.00 – 10.00	Frequent (many BH)



Figure 7 Borehole Location Sector 142 to Botanical Garden (CH: 1+450 km to 2+515 km)

4.1.4 Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30)

This zone is characterized by the presence of significant and relatively continuous inorganic silt (ML) layers. The upper strata consist of silty sand; however, thick ML layers are encountered in the intermediate depth range.

The intermediate layer (≈13 m to 23 m) is dominated by ML, while deeper strata consist of alternating SM and ML layers.

Table 9 Subsurface Stratification (BH-21 to BH-30)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Loose to Medium Dense	0.75	4.00 – 9.25	3.25 – 8.50	Majority
Silty Sand (SM)	Medium Dense to Dense	4.00 – 7.00	13.00 – 16.00	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	8.25 – 15.25	17.25 – 22.00	Variable	Majority
Silty Sand (SM)	Very Dense (with/without gravel)	17.25 – 26.25	30.50	4.25 – 13.25	All Boreholes
Inorganic Silt (ML)	Medium Stiff to Hard	0.75 – 16.00	14.25 – 30.50	Variable	Majority



Figure 8 Borehole Location Sector 142 to Botanical Garden (CH: 2+515 km to 3+515 km)

4.1.5 Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40)

The subsurface profile is predominantly sandy with the presence of inorganic silt (ML) near the surface. Below this, medium dense to dense silty sand is encountered.

The intermediate strata are mostly sandy with localized ML layers, while deeper strata consist of continuous very dense silty sand.

Table 10 Subsurface Stratification (BH-31 to BH-40)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Inorganic Silt (ML)	Medium Stiff to Hard (near surface)	0.75 – 4.00	3.25 – 7.00	2.50 – 6.25	Majority
Silty Sand (SM)	Loose to Medium Dense	0.75 – 5.25	8.25 – 13.00	Variable	All Boreholes
Silty Sand (SM)	Medium Dense to Dense	3.25 – 8.25	12.25 – 21.25	Variable	All Boreholes
Silty Sand (SM)	Dense	8.25 – 16.00	19.00 – 28.00	Variable	Majority
Silty Sand (SM)	Very Dense (with/without gravel)	12.25 – 21.25	30.00 – 35.00	8.00 – 15.00	All Boreholes
Inorganic Silt (ML)	Very Stiff to Hard (intermediate layer)	8.25 – 13.00	13.00 – 14.25	~3.00 – 6.00	BH-36, 37, 38

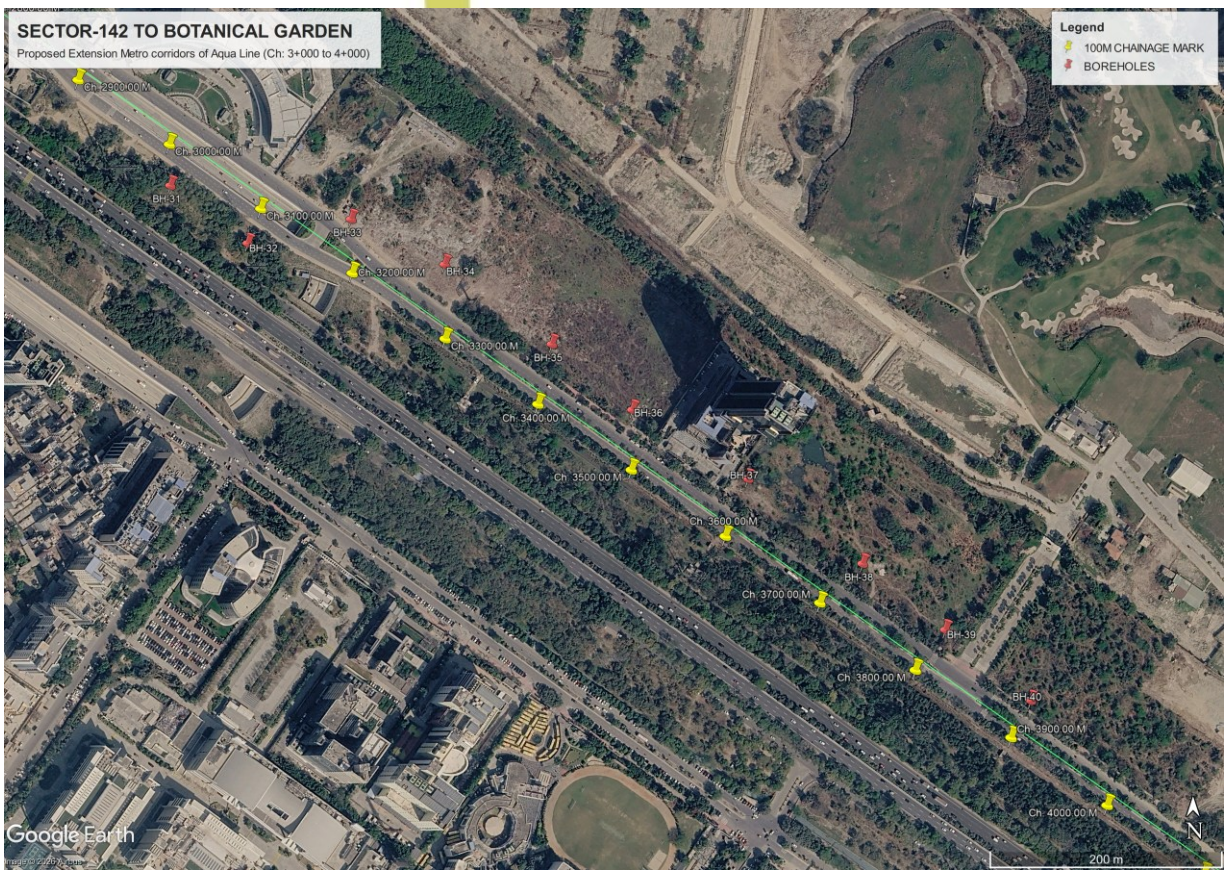


Figure 9 Borehole Location Sector 142 to Botanical Garden (CH: 3+515 km to 4+520 km)

4.1.6 Zone 6: CH: 4+520 km to 5+530 km (BH-41 to BH-50)

This stretch shows predominantly silty sand (SM) deposits with increasing density with depth. ML layers are encountered locally but are discontinuous.

Intermediate strata consist of dense silty sand, and deeper strata comprise continuous very dense silty sand.

Table 11 Subsurface Stratification (BH-41 to BH-50)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Loose to Medium Dense	0.75	5.25 – 11.25	4.50 – 10.50	All Boreholes
Silty Sand (SM)	Medium Dense to Dense	5.25 – 9.25	11.25 – 15.25	Variable	All Boreholes
Silty Sand (SM)	Dense	7.00 – 11.25	14.25 – 17.25	Variable	Majority
Silty Sand (SM)	Very Dense (with/without gravel/clay)	9.25 – 21.25	30.00 – 35.00	10.00 – 20.00	All Boreholes
Inorganic Silt (ML)	Stiff to Hard (localized layers)	0.75 – 24.25	5.25 – 29.25	3.00 – 10.00	Majority

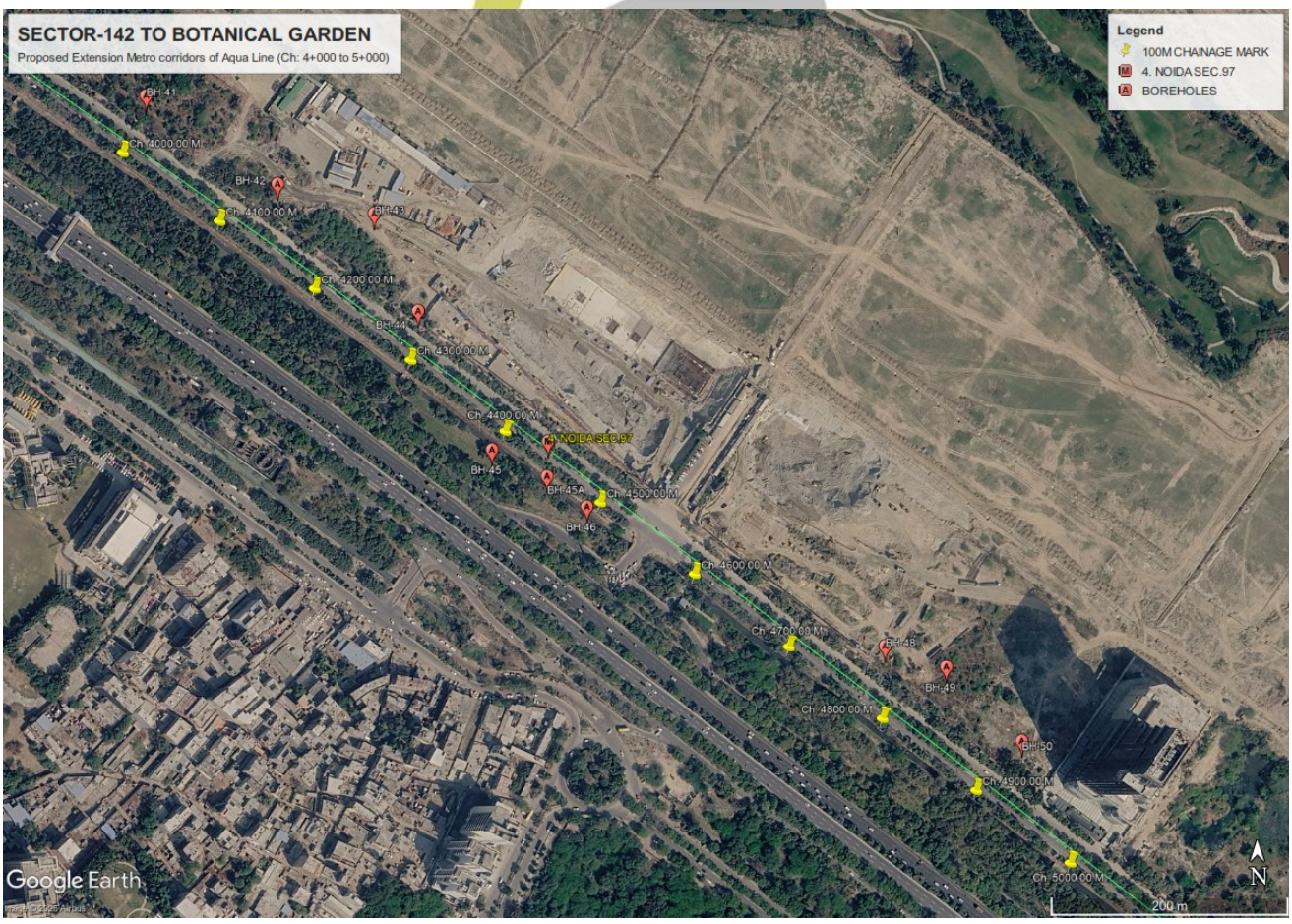


Figure 10 Borehole Location Sector 142 to Botanical Garden (CH: 4+520 km to 5+530 km)

4.1.7 Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60)

This zone exhibits alternating layers of silty sand (SM) and inorganic silt (ML). ML layers are present at shallow, intermediate, and deeper depths.

Intermediate strata show strong interlayering, while deeper strata consist of very dense silty sand with intermittent ML layers.

Table 12 Subsurface Stratification (BH-51 to BH-60)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Inorganic Silt (ML)	Stiff to Hard (near surface)	0.75 – 8.25	4.00 – 14.25	3.00 – 8.00	BH-51, 53, 56, 58
Silty Sand (SM)	Loose to Medium Dense	0.75 – 8.25	10.00 – 13.00	Variable	All Boreholes
Silty Sand (SM)	Medium Dense to Dense	4.00 – 12.25	14.25 – 21.25	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	10.00 – 14.25	20.25 – 26.25	Variable	Majority
Silty Sand (SM)	Very Dense (with gravel/clay)	14.25 – 23.25	30.00 – 35.00	8.00 – 15.00	All Boreholes
Inorganic Silt (ML)	Intermediate to Deep ML layers	6.25 – 23.25	14.25 – 30.00	3.00 – 10.00	BH-51, 52, 53, 56, 58, 59, 60



Figure 11 Borehole Location Sector 142 to Botanical Garden (CH: 5+530 km to 6+490 km)

4.1.8 Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70)

This is a highly variable zone characterized by frequent and continuous ML layers. A relatively continuous ML layer is observed in the intermediate depth range.

The deeper strata consist of mixed SM and ML layers.

Table 13 Subsurface Stratification (BH-61 to BH-70)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Medium Dense to Dense	0.75 – 11.25	8.25 – 14.25	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	11.25 – 18.25	20.25 – 30.00	Variable	Majority
Silty Sand (SM)	Very Dense with gravel	14.25 – 26.25	30.00 – 35.00	8.00 – 15.00	All Boreholes
Inorganic Silt (ML)	Near-surface to intermediate	0.75 – 9.25	8.25 – 14.25	3.00 – 8.00	BH-62, 63, 64, 66
Inorganic Silt (ML)	Intermediate to deep layers	8.25 – 23.25	14.25 – 30.00	4.00 – 12.00	All Boreholes
Silty Gravel (GM)	Dense gravelly layer (localized)	12.25	18.25	~6.00	BH-65 only

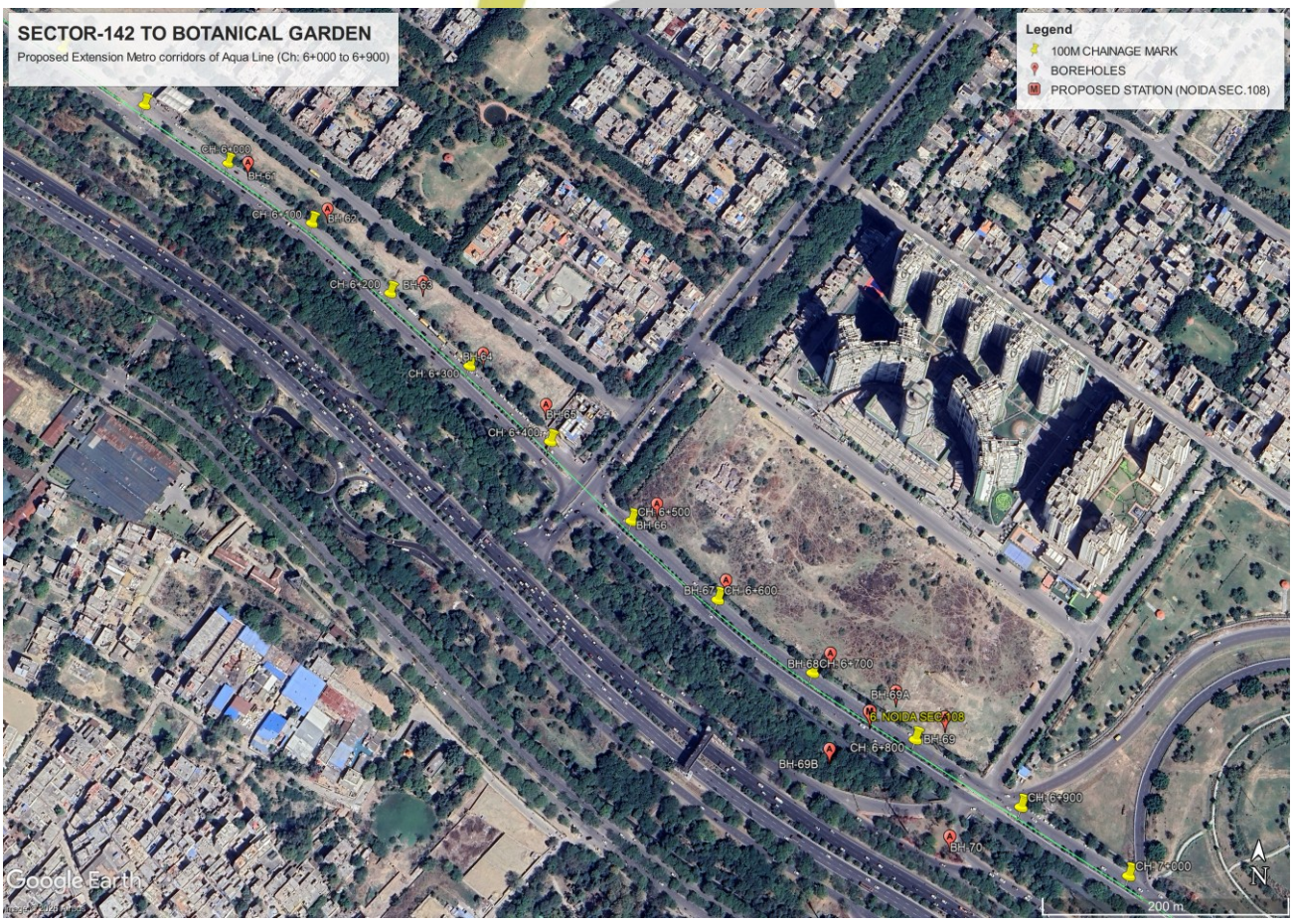


Figure 12 Borehole Location Sector 142 to Botanical Garden (CH: 6+490 km to 7+490 km)

4.1.9 Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80)

The subsurface profile is predominantly sandy with localized ML layers. The upper strata consist of silty sand, while ML layers occur intermittently.

Intermediate strata are mostly dense SM, and deeper strata comprise very dense silty sand.

Table 14 Subsurface Stratification (BH-71 to BH-80)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Loose to Medium Dense	0.75 – 6.25	5.25 – 13.00	Variable	All Boreholes
Silty Sand (SM)	Medium Dense to Dense	4.00 – 11.25	14.25 – 20.25	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	10.00 – 20.25	18.25 – 26.25	Variable	Majority
Silty Sand (SM)	Very Dense (with gravel)	14.25 – 26.25	30.50	6.00 – 15.00	All Boreholes
Inorganic Silt (ML)	Near-surface / intermediate	0.75 – 7.00	6.25 – 15.25	3.00 – 8.00	BH-71, 74, 75, 76, 77, 80
Inorganic Silt (ML)	Deep ML layers	8.25 – 23.25	15.25 – 26.25	3.00 – 10.00	BH-72, 74, 76, 80

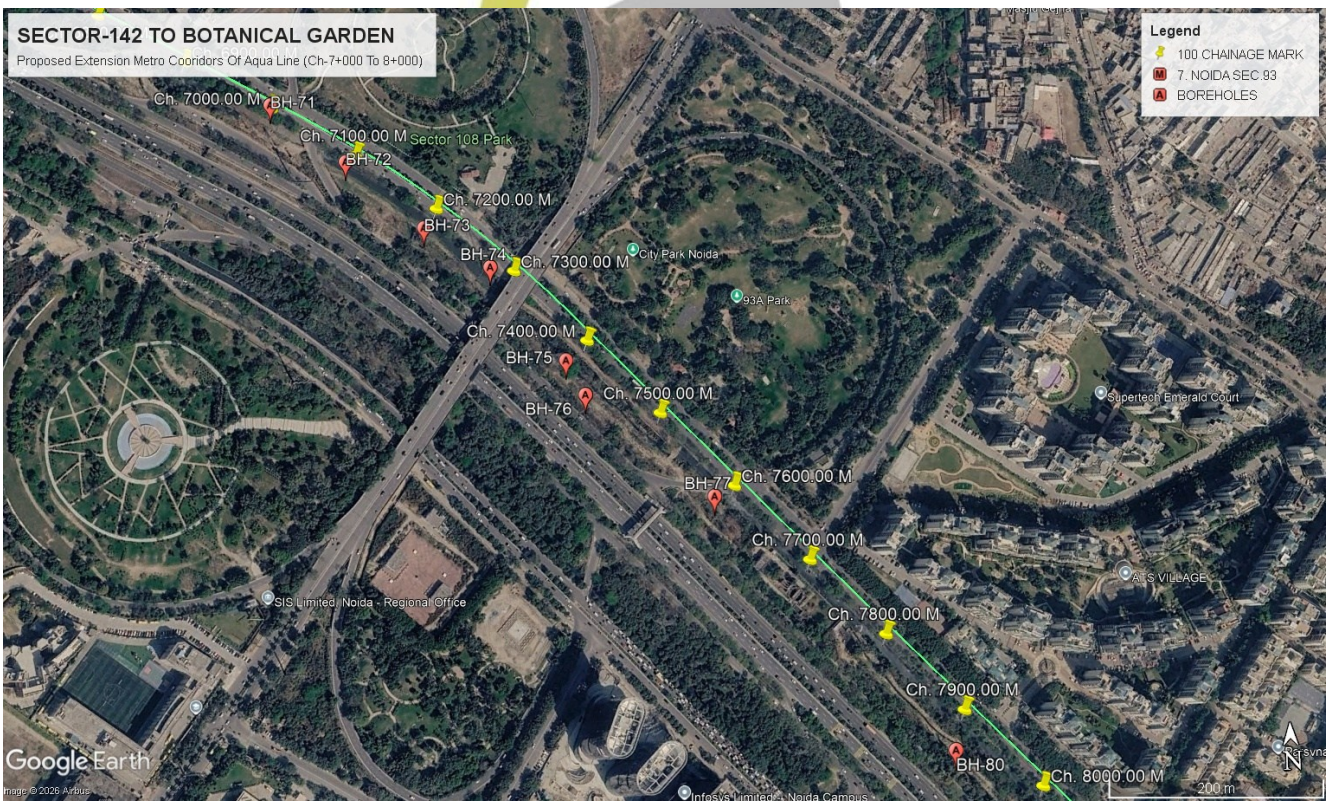


Figure 13 Borehole Location Sector 142 to Botanical Garden (CH: 7+490 km to 8+550 km)

4.1.10 Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89)

This zone exhibits a uniform sandy profile with minimal ML presence. The strata transition from loose to very dense silty sand with depth.

Intermediate and deep layers are predominantly dense to very dense SM.

Table 15 Subsurface Stratification (BH-82 to BH-89)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Loose	0.75	4.00 – 5.25	3.25 – 4.50	All Boreholes
Silty Sand (SM)	Medium Dense	4.00 – 5.25	8.25 – 12.25	Variable	All Boreholes
Silty Sand (SM)	Dense	8.25 – 12.25	14.25 – 20.25	Variable	All Boreholes
Silty Sand (SM)	Very Dense (with/without gravel)	14.25 – 20.25	30.50	10.00 – 16.00	All Boreholes
Inorganic Silt (ML)	Intermediate layer (localized)	8.25 – 9.25	14.25 – 24.25	3.00 – 6.00	BH-86, BH-88, BH-89



Figure 14 Borehole Location Sector 142 to Botanical Garden (CH: 8+550 km to 9+430 km)

4.1.11 Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100)

This stretch shows predominantly silty sand with intermittent ML layers. The ML layers are discontinuous and occur at varying depths.

Intermediate strata show mixed behavior, while deeper strata consist of very dense silty sand.

Table 16 Subsurface Stratification (BH-91 to BH-100)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Inorganic Silt (ML)	Near-surface layer	0.75 – 7.00	4.00 – 13.00	3.00 – 8.00	BH-91, BH-92, BH-97
Silty Sand (SM)	Loose to Medium Dense	0.75 – 8.25	7.00 – 13.00	Variable	All Boreholes
Silty Sand (SM)	Medium Dense to Dense	4.00 – 13.00	14.25 – 21.25	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	11.25 – 18.25	21.25 – 26.25	Variable	Majority
Silty Sand (SM)	Very Dense (with/without gravel)	14.25 – 23.25	30.50	8.00 – 15.00	All Boreholes
Inorganic Silt (ML)	Intermediate to deep layers	5.25 – 23.25	11.25 – 30.50	3.00 – 10.00	BH-91, 92, 95, 96, 97, 98, 100



Figure 15 Borehole Location Sector 142 to Botanical Garden (CH: 9+430 km to 10+540 km)

4.1.12 Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109)

The subsurface profile consists mainly of silty sand with localized ML layers and an isolated clay (CL) layer.

Intermediate strata show SM with ML interlayers, while deeper strata are dominated by very dense silty sand.

Table 17 Subsurface Stratification (BH-101 to BH-109)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Loose to Medium Dense	0.75 – 10.00	6.25 – 16.00	Variable	All Boreholes
Silty Sand (SM)	Medium Dense to Dense	4.00 – 11.25	14.25 – 18.25	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	10.00 – 18.25	20.25 – 24.25	Variable	Majority
Silty Sand (SM)	Very Dense (with gravel)	14.25 – 24.25	30.50	8.00 – 16.00	All Boreholes
Inorganic Silt (ML)	Near-surface to intermediate	0.75 – 12.25	10.00 – 16.00	3.00 – 8.00	BH-102, 103, 104, 106, 107
Inorganic Silt (ML)	Intermediate to deep layers	10.00 – 24.25	14.25 – 30.50	3.00 – 10.00	BH-102, 103, 104, 106, 107
Inorganic Clay (CL)	Localized clay layer	10.00	24.25	~14.25	BH-109 only

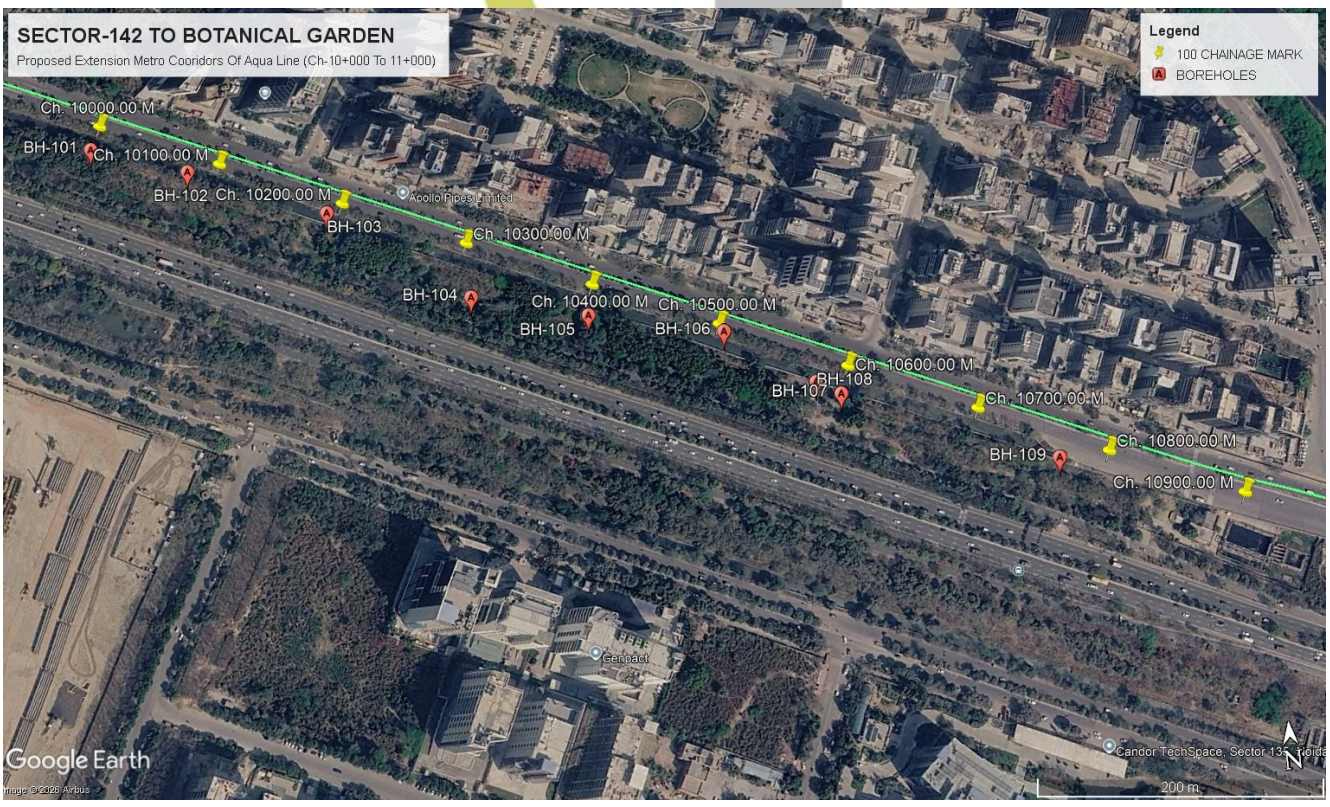


Figure 16 Borehole Location Sector 142 to Botanical Garden (CH: 10+540 km to 11+400 km)

4.1.13 Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116)

This zone is characterized by frequent interlayering of silty sand (SM) and inorganic silt (ML) at multiple depths.

Intermediate strata show multiple ML bands, while deeper strata consist of SM with intermittent ML layers.

Table 18 Subsurface Stratification (BH-111 to BH-116)

Strata Type	Description	Top Depth Range (m)	Bottom Depth Range (m)	Thickness Variation (m)	Occurrence
Top Soil	Organic surface layer	0.00	0.75	~0.75	All Boreholes
Silty Sand (SM)	Loose to Medium Dense	0.75 – 8.25	5.25 – 11.25	Variable	All Boreholes
Silty Sand (SM)	Medium Dense to Dense	4.00 – 11.25	14.25 – 17.25	Variable	All Boreholes
Silty Sand (SM)	Dense to Very Dense	8.25 – 17.25	20.25 – 27.25	Variable	All Boreholes
Silty Sand (SM)	Very Dense	14.25 – 23.25	30.50	8.00 – 15.00	All Boreholes
Inorganic Silt (ML)	Near-surface layer	0.75 – 5.25	4.00 – 8.25	3.00 – 6.00	BH-113, BH-114, BH-115
Inorganic Silt (ML)	Intermediate layers	8.25 – 14.25	11.25 – 20.25	3.00 – 8.00	BH-112, 113, 114, 115, 116
Inorganic Silt (ML)	Deep layers	17.25 – 27.25	20.25 – 30.50	3.00 – 8.00	BH-112, 113, 114, 115, 116

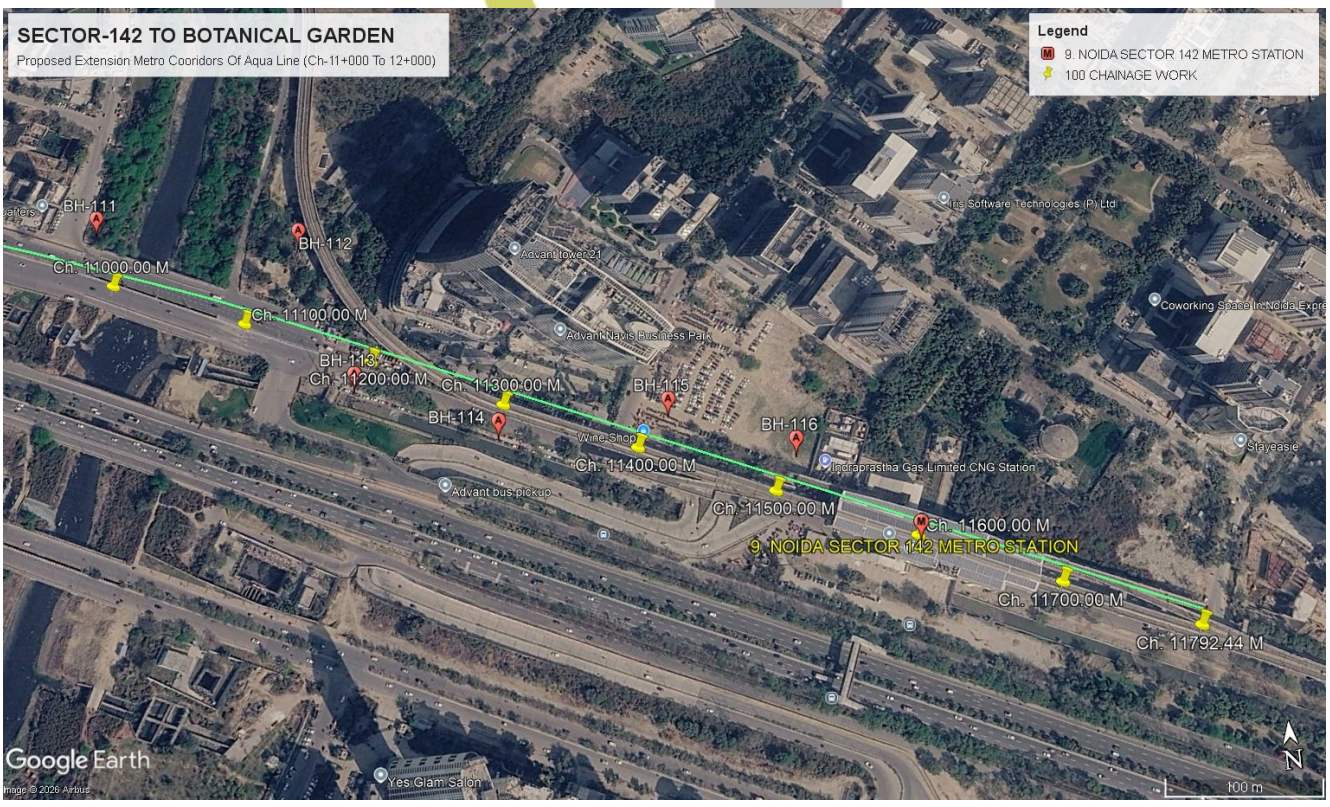


Figure 17 Borehole Location Sector 142 to Botanical Garden (CH: 11+400 km to 12+130 km)

4.2 Geotechnical Properties of Soil

The geotechnical parameters for the subsurface strata have been evaluated based on the results of field and laboratory testing carried out on soil samples obtained from the boreholes. The parameters have been derived in accordance with relevant Indian Standard (IS) codes and standard geotechnical engineering practices.

The field investigations include Standard Penetration Tests (SPT) conducted at regular depth intervals, which provide an indication of the in-situ soil density and strength characteristics. Laboratory tests were performed on representative disturbed and undisturbed samples to determine index and engineering properties such as grain size distribution, Atterberg limits, natural moisture content, unit weight, shear strength parameters, and compressibility characteristics.

Based on the test results, the soil strata have been classified as per the IS Classification System and appropriate design parameters have been adopted for each soil layer. Where required, the test results have been reviewed, and representative or conservative values have been considered to account for variability in subsurface conditions.

The derived geotechnical parameters have been used for the analysis of bearing capacity, settlement assessment, and foundation design considerations for the proposed structures. The adopted design parameters are summarized in the subsequent sections of this report.

4.2.1 Geotechnical Properties of soil - Zone 1: CH: 0-380 km to 0+500 km (BH-(-02) to BH-(-09))

Table 19 Geotechnical Properties of soil - Zone 1

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top soil	TS	-	-	7.9	54.8	37.3	23	NP	NP	-	-	-	-	-
2	Medium Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	6	7	1.6	23.1	75.3	23	NP	NP	16.61	16.00	2.69	0.08	21
3	Hard, Dark Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	40	25	2.9	40.9	56.2	22	NP	NP	18.58	18.50	2.76	0.08	26
4	Loose, Greyish to Brownish Gray, fine-grained silty sand	SM	7	8	8.4	70.0	21.6	24	NP	NP	17.45	15.95	2.68	0.04	22
5	Loose to Medium Dense, Brownish to dark brownish, fine-grained silty sand	SM	17	15	8.1	67.8	24.8	24	NP	NP	17.86	17.00	2.62	0.03	25
6	Medium Dense, Brownish to yellowish, fine-grained silty sand with gravel	SM	19	17	5.6	69.9	24.5	26	NP	NP	19.98	17.55	2.69	0.02	25
7	Dense, Brownish to Greyish, fine-grained silty sand	SM	41	27	6.2	73.4	20.4	25	NP	NP	18.40	18.50	2.66	0.03	28
8	Dense to very Dense, Brownish to Greyish, fine-grained silty sand with gravel	SM	44	24	8.2	70.7	21.1	24	NP	NP	22.11	19.50	2.69	0.04	29
9	Very Dense, Gray Brownish to Brownish, fine-grained silty sand	SM	80	31	6.7	72.5	20.8	25	NP	NP	16.46	20.00	2.68	0.04	31

4.2.2 Geotechnical Properties of soil - Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09)

Table 20 Geotechnical Properties of soil - Zone 2

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	8.2	61.2	30.6	23	NP	NP	-	-	-	-	-
2	Hard, yellowish, fine-grained inorganic silt of low Plasticity with sand with Gravel	ML	49	24	2.4	27.9	69.7	24	NP	NP	17.20	18.90	2.67	0.09	27
3	Medium dense, dark grey to brownish, fine-grained silty sand	SM	14	14	6.7	66.0	27.3	26	NP	NP	20.00	17.00	2.68	0.03	25
4	Dense, dark grey to brownish grey, fine-grained silty sand	SM	43	26	5.5	69.7	24.8	26	NP	NP	18.90	19.00	2.70	0.03	29
5	Dense to very dense, brownish to yellowish, fine-grained silty sand with Gravel	SM	54	25	3.5	73.1	23.4	26	NP	NP	17.05	19.50	2.69	0.02	30
5	Very dense, brownish grey to dark brownish, fine-grained silty sand with gravel	SM	87	34	6.2	70.8	23.0	25	NP	NP	14.80	20.00	2.69	0.04	31

4.2.3 Geotechnical Properties of soil - Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A)

Table 21 Geotechnical Properties of soil - Zone 3

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	6.3	57.7	36.0	23	NP	NP	-	-	-	-	-
2	Medium Stiff, Brownish Gray, fine-grained inorganic silt of low Plasticity with sand	ML	8	9	6.6	61.5	31.9	27	NP	NP	-	16.40	2.69	0.07	23
3	Medium Stiff to Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	9	10	2.7	34.6	62.7	26	NP	NP	16.42	16.80	2.69	0.07	23
4	Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	14	13	3.7	26.6	69.7	23	NP	NP	-	17.50	2.66	0.07	24
5	Very Stiff, Greyish, fine-grained inorganic silt of low Plasticity with sand	ML	21	17	2.0	28.4	69.6	23	NP	NP	17.14	18.00	2.71	0.05	26
6	Hard, Yellowish to Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	57	25	3.2	38.5	58.3	26	NP	NP	17.00	18.90	2.69	0.10	27
7	Loose, Yellowish to Brownish, fine-grained silty sand and Gravel	SM	8	9	7.0	69.2	23.8	26	NP	NP	15.40	16.50	2.69	0.01	22
8	Loose to Medium Dense, Brownish Gray to Brownish, fine-grained silty sand and Gravel	SM	16	16	8.4	69.4	22.2	25	NP	NP	16.07	17.00	2.64	0.02	25
9	Medium Dense, Greyish to Brownish Gray, fine-grained silty sand	SM	21	18	7.2	68.7	24.1	25	NP	NP	17.77	17.75	2.66	0.03	26
10	Dense, Brownish, fine-grained silty sand and Gravel	SM	39	27	6.4	72.0	21.6	25	NP	NP	18.52	19.10	2.65	0.03	28
11	Dense to Very Dense, Brownish to Yellowish fine-grained silty sand and Gravel	SM	46	27	4.9	71.1	24.0	24	NP	NP	19.00	19.50	2.70	0.03	28
12	Very Dense, Brownish to Gray, fine-grained silty sand and Gravel	SM	78	31	5.9	71.5	22.6	24	NP	NP	18.25	20.00	2.69	0.03	30

4.2.4 Geotechnical Properties of soil - Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30)

Table 22 Geotechnical Properties of soil - Zone 4

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	6.4	56.7	36.9	24	NP	NP	-	-	-	-	-
2	Medium Stiff, Yellowish to Brownish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	8	9	2.0	31.4	66.6	26	NP	NP	-	-	-	-	-
3	Stiff to Very Stiff, Brownish Yellow Whiteish Grey, fine-grained inorganic silt of low Plasticity with sand	ML	16	16	3.5	35.4	61.1	26	NP	NP	15.96	17.95	2.67	0.04	26
4	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	5	23	3.9	21.5	75.3	26	NP	NP	20.79	18.83	2.69	0.06	28
5	Hard, Reddish Brown to Brownish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	63	27	6.4	26.2	67.4	24	NP	NP	20.91	19.22	2.67	0.08	29
6	Loose, Brownish, fine-grained silty sand	SM	8	10	5.8	68.4	25.8	26	NP	NP	9.15	16.97	2.73	0.01	23
7	Loose to Medium Dense, Greyish to Brownish Gray, fine-grained silty sand	SM	18	19	7.0	67.4	25.6	25	NP	NP	13.29	17.95	2.67	0.04	26
8	Medium Dense, Greyish to Brownish Gray, fine-grained silty sand	SM	19	16	6.6	66.2	27.6	25	NP	NP	15.10	17.55	2.65	0.03	26
9	Medium Dense to Dense, Greyish to Brownish, fine-grained silty sand	SM	43	25	6.0	67.4	26.9	25	NP	NP	17.34	19.12	2.67	0.03	28
10	Dense to Very Dense, Greyish, to Brownish, fine-grained silty sand	SM	44	22	5.9	72.3	21.8	24	NP	NP	16.06	19.50	2.65	0.05	29
11	Very Dense, Greyish to Brownish Gray, fine-grained silty sand	SM	83	31	3.9	66.8	29.6	25	NP	NP	16.78	20.00	2.70	0.04	32

4.2.5 Geotechnical Properties of soil - Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40)

Table 23 Geotechnical Properties of soil - Zone 5

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	3.0	34.8	62.2	-	-	-	-	-	-	-	-
2	Medium Stiff, Brownish to Whiteish, fine-grained inorganic silt of low Plasticity with sand	ML	9	12	1.9	40.5	57.6	25	NP	NP	14.10	16.40	2.69	0.07	23
3	Medium Stiff to Stiff, Yellowish to Whiteish Brown, fine-grained inorganic silt of low Plasticity with sand with Gravel	ML	13	15	2.8	30.1	67.1	26	NP	NP	13.67	17.10	2.69	0.03	24
4	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	25	21	2.2	28.8	69.6	26	NP	NP	15.03	18.70	2.64	0.07	26
5	Loose, Whiteish Grey, fine-grained silty sand	SM	10	11	3.4	65.6	31.0	24	NP	NP	11.30	16.50	-	0.02	22
6	Medium Dense, Brownish Grey to Dark Brownish, fine-grained silty sand with Gravel	SM	19	16	5.7	68.2	26.1	25	NP	NP	11.80	18.00	2.65	0.00	26
7	Medium Dense to Dense, Little Brownish, fine-grained silty sand with Gravel	SM	36	29	6.7	69.5	23.8	26	NP	NP	13.33	19.00	2.66	0.00	27
8	Dense, Brownish, fine-grained silty sand with Little Gravel	SM	44	25	6.2	68.0	25.8	24	NP	NP	13.85	19.50	2.65	0.03	29
9	Very Dense, Brownish, fine-grained silty sand with Gravel	SM	73	30	6.2	69.4	24.4	24	NP	NP	12.86	20.00	2.65	0.03	31

4.2.6 Geotechnical Properties of soil - Zone 6: CH: 4+520 km to 5+530 km (BH-41 to BH-50)

Table 24 Geotechnical Properties of soil - Zone 6

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (KN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (º)
1	Top Soil	TS	-	-	5.2	49.5	45.3	23	NP	NP	-	-	-	-	-
2	Stiff to Very Stiff, Brownish to Greyish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	16	18	1.8	25.9	72.3	25	NP	NP	-	-	-	-	-
3	Hard, Yellowish to Brownish, fine-grained inorganic silt of low Plasticity with Gravel	ML	86	33	2.5	28.2	69.3	26	NP	NP	16.2	19.70	2.65	0.08	28
4	Loose to Medium Dense, Yellowish to Brownish, fine-grained silty sand	SM	16	16	7.6	63.7	28.7	25	NP	NP	11.9	17.10	2.63	0.04	25
5	Medium Dense, Greyish, fine-grained silty sand	SM	26	25	6.8	68.7	24.5	27	NP	NP	12.4	18.05	2.69	0.06	26
6	Medium Dense to Dense, Brownish Grey to Grey, fine-grained silty sand	SM	39	39	9.2	64.3	26.5	25	NP	NP	13.7	-	2.67	0.06	26
7	Dense, Brownish Gray, fine-grained silty sand with Clay and Gravel	SM	42	33	8.5	65.3	26.2	24	NP	NP	13.4	18.53	2.64	0.05	28
8	Dense to Very Dense, Brownish Grey to Greyish, fine-grained silty sand	SM	49	34	7.9	63.1	29.0	24	NP	NP	13.2	-	2.64	0.07	29
9	Very Dense, Yellowish Brown to Brownish Grey, fine-grained silty sand	SM	91	35	7.3	66.0	26.7	25	NP	NP	13.6	19.91	2.66	0.03	31

4.2.7 Geotechnical Properties of soil - Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60)

Table 25 Geotechnical Properties of soil - Zone 7

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	7.5	53.9	38.6	-	-	-	-	-	-	-	-
2	Medium Stiff to Stiff, fine-grained inorganic silt of low Plasticity with sand	ML	11	14	3.6	43.6	52.8	26	NP	NP	11.90	16.75	2.67	0.02	23
3	Stiff to Very Stiff, Whiteish Grey, fine-grained inorganic silt of low Plasticity with sand	ML	18	17	1.4	37.5	61.1	25	NP	NP	9.70	18.50	2.66	0.07	24
4	Very Stiff, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	31	25	6.8	30.7	62.5	27	NP	NP	14.10	18.70	2.66	0.08	27
5	Hard , Gray to Brownish Gray, fine-grained inorganic silt of low Plasticity with sand (ML)	ML	70	34	3.5	27.7	68.8	25	NP	NP	16.07	19.70	2.66	0.10	28
6	Loose, Grey to Grey Brownish, fine-grained silty sand	SM	9	10	6.5	62.1	31.4	26	NP	NP	11.42	15.30	2.73	0.20	21
7	Loose to Medium Dense, Brownish Gray, fine-grained silty sand	SM	16	8	7.3	62.2	30.5	25	NP	NP	11.32	18.25	2.61	0.04	24
8	Medium Dense, Brownish to Grey, fine-grained silty sand	SM	19	18	7.0	72.1	20.9	26	NP	NP	11.18	18.35	2.65	0.06	26
9	Medium Dense to Dense, Brownish to Greyish, fine-grained silty sand	SM	30	27	6.9	63.2	29.9	25	NP	NP	13.81	18.93	2.65	0.05	26
10	Dense, Brownish to Gray Brownish, fine-grained silty sand	SM	40	26	5.4	70.4	24.2	26	NP	NP	12.17	-	2.65	0.12	28
11	Very Dense, Gray to Brownish Gray, fine-grained silty sand	SM	86	34	5.5	67.2	27.3	24	NP	NP	13.08	20.50	2.66	0.06	30

4.2.8 Geotechnical Properties of soil - Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70)

Table 26 Geotechnical Properties of soil - Zone 8

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m³)	Specific Gravity	Cohesion (c') (kg/cm₂)	Friction Angle (º)
1	Top Soil	TS	-	-	6.9	57.9	35.2	24	NP	NP	-	-	-	-	-
2	Medium stiff to Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	13	15	4.5	26.8	68.7	26	NP	NP	11.7	17.65	2.64	0.04	24
3	Very Stiff to Hard, Brownish to Yellow, fine-grained inorganic silt of low Plasticity with sand	ML	40	24	4.8	25.4	69.8	26	NP	NP	13.3	19.20	2.64	0.07	27
4	Hard, Yellowish Brown, fine-grained inorganic silt of low Plasticity with sand with gravel	ML	66	30	4.4	28.5	67.1	25	NP	NP	14.3	20.20	2.65	0.10	29
5	Loose to Medium Dense, Brownish to Grayey, fine-grained silty sand	SM	22	18	7.8	62.4	29.8	23	NP	NP	9.3	16.80	2.71	0.06	26
6	Medium Dense to Dense, Brownish to Grayey, fine-grained silty sand with gravel	SM	22	19	7.7	66.5	25.8	26	NP	NP	12.2	17.95	2.65	0.06	26
7	Dense to Very Dense, Yellowish to Brownish Grey, fine-grained silty sand with gravel	SM	58	32	7.5	62.0	30.5	22	NP	NP	11.4	17.65	2.69	0.08	29
8	Very Dense, Brownish, Gray fine-grained silty sand with Gravel	SM	81	35	6.7	66.2	27.1	25	NP	NP	12.4	19.90	2.66	0.09	31

4.2.9 Geotechnical Properties of soil - Zone 9 CH: 7+490 km to 8+550 km (BH-71 to BH-80)

Table 27 Geotechnical Properties of soil - Zone 9

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m³)	Specific Gravity	Cohesion (c') (kg/cm₂)	Friction Angle (º)
1	Top Soil	TS	-	-	6.5	56.3	37.2	23	NP	NP	-	-	-	-	-
2	Medium Stiff to Stiff, Brownish Grey, fine-grained inorganic silt of low Plasticity with sand and gravel	ML	10	11	3.2	26.2	70.6	25	NP	NP	-	-	-	-	-
3	Stiff to Very Stiff, Whiteish, fine-grained inorganic silt of low Plasticity with sand	ML	24	19	2.5	33.6	63.9	25	NP	NP	-	17.10	2.69	0.04	27
4	Very Stiff to Hard, Brownish Grey, fine-grained inorganic silt of low Plasticity with sand and gravel	ML	34	26	4.6	27.5	67.9	25	NP	NP	23.17	19.40	2.70	0.07	27
5	Hard, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity with sand	ML	54	25	3.2	25.0	71.8	27	NP	NP	22.57	19.40	2.68	0.03	29
6	Loose to Medium Dense, Brownish to Brownish Grey, fine-grained silty sand and Gravel	SM	8	9	6.2	62.7	31.1	26	NP	NP	17.86	17.10	2.69	0.03	23
7	Medium Dense, Brownish Grey to yellowish, fine-grained silty sand and Gravel	SM	23	18	8.3	63.9	27.8	25	NP	NP	18.44	17.45	2.65	0.04	27
8	Dense, yellowish to Brownish, fine-grained silty sand and Gravel	SM	39	21	5.2	69.6	25.2	26	NP	NP	16.75	19.00	2.66	0.05	30
9	Dense to Very Dense, Whiteish Brown to Brownish Grey, fine-grained silty sand with Gravel	SM	50	22	4.1	63.6	32.3	25	NP	NP	22.23	19.50	2.68	0.04	31
10	Very Dense, Brownish Grey to Yellowish, fine-grained silty sand and gravel	SM	77	31	6.2	64.7	29.1	25	NP	NP	17.42	20.00	2.68	0.03	32

4.2.10 Geotechnical Properties of soil - Zone 10 CH: 8+550 km to 9+430 km (BH-82 to BH-89)

Table 28 Geotechnical Properties of soil - Zone 10

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	7.7	69.3	23.0	22	NP	NP	-	-	-	-	-
2	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand and gravel	ML	24	18	15.6	21.2	63.2	23	NP	NP	14.86	18.90	2.72	0.01	25
3	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand and gravel	ML	27	21	2.5	27.2	70.3	25	NP	NP	17.40	19.40	2.60	0.05	26
4	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	100	38	2.7	25.2	72.1	25	NP	NP	17.26	19.40	2.61	0.11	27
5	Loose, Brownish to Grey, fine-grained silty sand	SM	7	8	8.3	67.3	24.4	26	NP	NP	13.70	16.50	2.67	0.01	23
6	Medium Dense, Brownish, fine-grained silty sand with Gravel	SM	17	16	5.7	69.8	24.5	25	NP	NP	18.68	17.65	2.71	0.03	26
7	Dense, Brownish to Grey, fine-grained silty sand	SM	41	25	5.4	68.5	26.1	24	NP	NP	18.12	19.00	2.66	0.04	29
8	Very Dense, Yellowish Brown to Brownish , fine-grained silty sand	SM	79	31	6.7	70.3	23.0	25	NP	NP	17.46	20.00	2.67	0.04	31

4.2.11 Geotechnical Properties of soil - Zone 11 CH: 9+430 km to 10+540 km (BH-91 to BH-100)

Table 29 Geotechnical Properties of soil - Zone 11

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (kN/m^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	6.8	52.4	40.8	22	NP	NP	-	-	-	-	-
2	Medium stiff to stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand with Gravel	ML	10	11	2.1	29.3	68.6	26	NP	NP	4.76	16.10	2.72	0.08	21
3	Stiff to Very Stiff, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity with sand with Gravel	ML	24	20	2.0	29.7	68.3	26	NP	NP	21.49	17.00	2.74	0.09	27
4	Very stiff, Yellowish, fine-grained inorganic silt of low Plasticity with sand with Gravel	ML	26	21	10.3	22.5	67.2	25	NP	NP	18.23	17.75	2.66	0.06	26
5	Hard, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity with sand with Gravel	ML	69	31	4.2	29.5	66.3	24	NP	NP	19.04	18.30	2.69	0.09	28
6	Loose, Brownish, fine-grained silty sand with Gravel	SM	8	9	11.3	66.7	22.0	25	NP	NP	19.45	16.60	2.66	0.02	23
7	Loose to Medium Dense, Brownish to Greyish, fine-grained silty sand	SM	14	15	8.7	68.3	23	26	NP	NP	6.10	17.65	2.66	0.05	24
8	Medium Dense, Greyish to Brownish, fine-grained silty sand with Gravel	SM	16	15	6.5	65.5	28	25	NP	NP	16.72	17.15	2.71	0.03	25
9	Dense, Brownish, fine-grained silty sand with Gravel	SM	41	24	6.8	66.6	26.6	24	NP	NP	17.74	18.15	2.68	0.03	29
10	Very Dense, Brownish Grey, fine-grained silty sand with Gravel	SM	82	31	5.4	68.1	26.5	25	NP	NP	19.05	19.50	2.67	0.03	31

4.2.12 Geotechnical Properties of soil - Zone 12 CH: 10+540 km to 11+400 km (BH-101 to BH-109)

Table 30 Geotechnical Properties of soil - Zone 12

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (gm/cm^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	8.3	62.9	28.8	22	NP	NP	-	-	-	-	-
2	Medium Stiff to Stiff, Yellowish to Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	7	8	3.2	30.0	66.8	26	NP	NP	9.88	16.20	2.65	0.02	20
3	Stiff to Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	20	18	2.8	35.9	61.3	24	NP	NP	19.92	17.25	2.67	0.04	26
4	Very Stiff, Yellowish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	21	18	2.7	22.3	75.0	23	NP	NP	-	17.75	-	0.06	26
5	Hard, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	54	27	3.0	28.1	68.9	26	NP	NP	-	18.30	2.66	0.09	28
6	Loose, Greyish to Brownish, fine-grained silty sand	SM	8	9	9.6	66.2	24.2	26	NP	NP	19.40	16.50	2.71	0.03	22
7	Loose to Medium Dense, Brownish to Brownish Gray, fine-grained silty sand	SM	15	15	5.8	67.4	26.8	26	NP	NP	18.28	17.00	2.64	0.03	26
8	Medium Dense, Gray Brownish to Greyish, fine-grained silty sand	SM	22	19	8.6	62.7	28.7	26	NP	NP	21.57	17.85	2.65	0.03	27
9	Dense, Greyish to Brownish fine-grained silty sand and Gravel	SM	41	25	3.2	67.8	29.0	24	NP	NP	18.53	19.00	2.67	0.03	28
10	Very Dense, Brownish Gray to Brownish, fine-grained silty sand and Gravel	SM	84	33	5.1	67.9	27.0	24	NP	NP	16.67	19.50	2.67	0.00	31

4.2.13 Geotechnical Properties of soil - Zone 13 CH: 11+400 km to 12+130 km (BH-111 to BH-116)

Table 31 Geotechnical Properties of soil - Zone 13

SR No.	Layer	Classification	N -SPT	N -SPT (Corrected)	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	Bulk Density (gm/cm^3)	Specific Gravity	Cohesion (c') (kg/cm$_2$)	Friction Angle (°)
1	Top Soil	TS	-	-	7.0	45.3	47.7	25	NP	NP	-	-	-	-	-
2	Medium Stiff to Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	9	10	3.9	24.9	71.2	26	NP	NP	14.00	16.20	2.66	0.05	23
3	Stiff to Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand	ML	13	14	3.1	21.0	75.9	26	NP	NP	-	17.25	-	0.04	26
4	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	22	19	3.2	21.9	74.9	25	NP	NP	25.57	17.75	2.62	0.06	26
5	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand and Gravel	ML	63	27	3.0	33.7	63.0	24	NP	NP	19.44	18.30	2.68	0.10	28
6	Loose to Medium Dense, Yellowish to Brownish, fine-grained silty sand	SM	10	10	6.9	68.5	24.6	25	NP	NP	23.40	17.00	2.71	0.02	24
7	Medium Dense to Dense, Greyish to Brownish, fine-grained silty sand and Gravel	SM	25	21	7.1	66.6	26.3	25	NP	NP	20.77	17.85	2.68	0.03	27
8	Dense, Brownish to Yellowish, fine-grained silty sand and Gravel	SM	44	25	5.5	65.8	28.7	25	NP	NP	18.29	19.00	2.67	0.03	28
9	Very Dense, Brownish to Yellowish, fine-grained silty sand	SM	85	32	4.6	63.9	31.5	24	NP	NP	19.61	19.50	2.69	0.04	30

4.3 Chemical Test Results of Soil and Groundwater

Chemical test results of soil and groundwater samples collected along the alignment have been analyzed to assess their aggressiveness towards concrete and steel. The detailed results are presented in Appendix C1 of this report .

The soil samples indicate pH values generally ranging from slightly neutral to moderately alkaline (approximately 6.4 to 8.8), suggesting non-aggressive soil conditions. The chloride content in soil is low, typically within the range of about 0.005% to 0.03%, and sulphate content is also within permissible limits, indicating that the soil is non-aggressive to concrete.

Groundwater samples show pH values ranging from about 6.2 to 8.3, which fall within acceptable limits as per IS recommendations. The sulphate concentration in groundwater is generally in the range of approximately 323 mg/l to 472 mg/l, and chloride concentration ranges between about 209 mg/l to 396 mg/l. These values are well within the permissible limits specified in IS 456:2000 for reinforced concrete.

Overall, the chemical characteristics of both soil and groundwater indicate mild to negligible aggressiveness, and therefore, no special protective measures are required for concrete from a chemical attack perspective, apart from standard good construction practices.

5 FOUNDATION ANALYSIS

An appropriate foundation for any structure should possess a sufficient margin of safety to prevent surpassing the bearing capacity of the supporting soils. Additionally, the vertical settlement caused by soil compression should remain within acceptable limits for the structure. We believe that following the recommendations provided here will ensure that the designed foundation meets these criteria.

5.1 Concepts for Foundation Analysis

5.1.1 Open Foundation on Soil

The assessment of bearing capacity for open foundations has been conducted following the broad guidelines outlined in IS: 6403 -1981.

The equation utilized for the bearing capacity is expressed as follows:

$$q_{net\,safe} = \frac{1}{F}\left[\,(c * N_c * s_c * d_c * i_c) + \left(q * (N_q - 1) * s_q * d_q * i_q\right) + \left(\frac{1}{2} * B * \gamma * N_\gamma * s_\gamma * d_\gamma * i_\gamma * W'\right)\right.$$

Where,

$q_{net\,safe}$ = Safe net bearing capacity of soil based on shear failure criterion,
F = Factor of safety, taken as 2.5 in accordance with IS: 1904 - 1986,
c = Cohesion
q = Overburden pressure,
B = Width of footing,
γ = Bulk unit weight of foundation soil,
W' = Water table correction factor,
N_c, N_q, N_γ = Bearing capacity factors,
s_c, s_q, s_γ = Shape factors
Continuous strip footing $s_c = s_q = s_\gamma = 1$,
Rectangular footing $s_c = s_q = \left(1 + 0.2 * \frac{B}{L}\right)$, $s_\gamma = \left(1 - 0.4 * \frac{B}{L}\right)$,
Square footing $s_c = 1.3$, $s_q = 1.2$, $s_\gamma = 0.8$,
Circular footing $s_c = 1.3$, $s_q = 1.2$, $s_\gamma = 0.6$,
d_c, d_q, d_γ = Depth factors
$d_c = 1 + 0.2 \tan\left(45 + \frac{\phi}{2}\right)\left(\frac{D}{B}\right)$,
For $\phi < 10$, $d_q = d_\gamma = 1$,
For $\phi > 10$, $d_q = d_\gamma = 1 + 0.1 \tan\left(45 + \frac{\phi}{2}\right)\left(\frac{D}{B}\right)$,
i_c, i_q, i_γ = inclination factors
$i_c = i_q = \left(1 - \frac{\alpha}{90}\right)^2$
$i_\gamma = \left(1 - \frac{\alpha}{\phi}\right)^2$
α = Inclination of the load at the vertical in degrees

The bearing capacity equation provided earlier has been applied with suitable values to calculate the secure net bearing capacity. These values underwent verification to assess the foundation settlement under the safe bearing pressure. The allowable bearing pressure has been determined as the lesser value between the two computed values: one derived from the bearing capacity shear failure criterion and the other computed based on the acceptable settlement criterion.

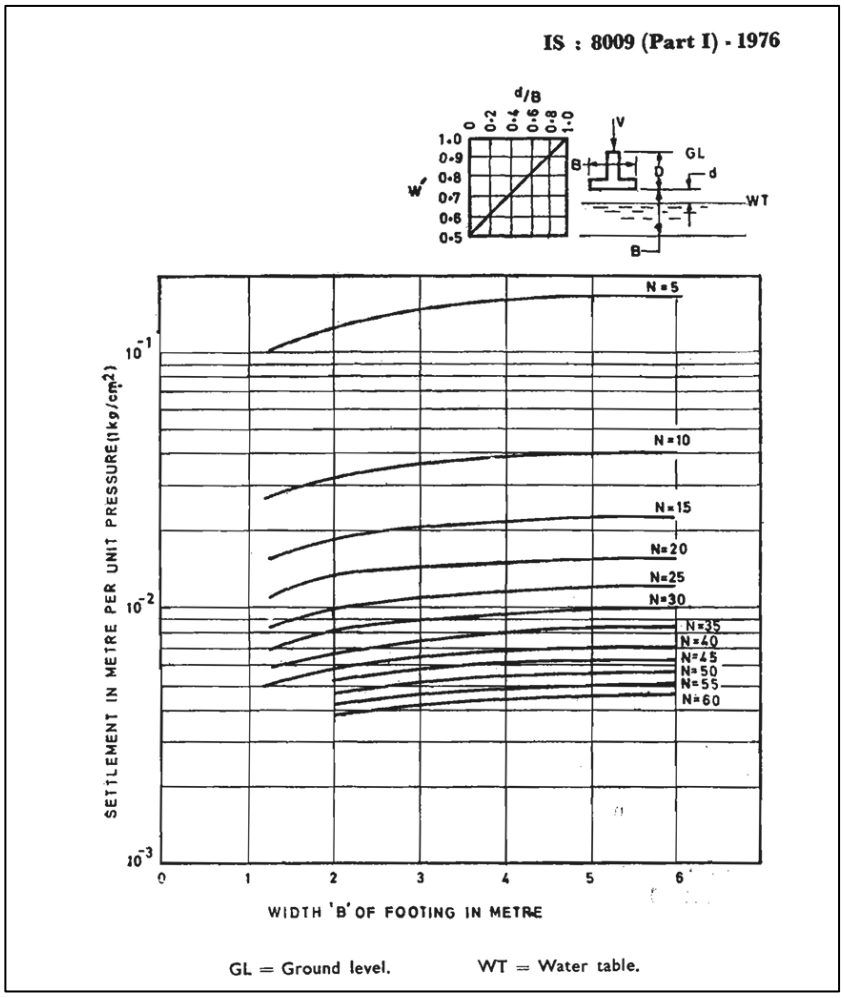


Figure 18 Settlement per Unit Pressure from Standard Penetration Resistance (Figure 9, IS 8009 (Part-1)-1976)

Settlement analysis was conducted based on SPT values following Clause 9.1.4 of IS 8009 (Part 1) - 1976. This was cross-verified against the settlement derived from classical analysis, which considers the sum of elastic and consolidation settlements.

5.1.2 Open Foundation on Rock

Analysis for allowable bearing capacity on rock has been done by following methods.

- Presumptive Bearing Pressure values (Table 2, Clause 5.2, IS: 12070 – 1987)
- Based on Rock Core Strength (Clause 6, IS: 12070 – 1987)
- Based on Rock Mass Rating (RMR) (Clause 5.3, IS: 12070 – 1987)

Presumptive values (As per IS: 12070 - 1987):

The classification of rock mass for assessing safe bearing pressure based on rock type is as follows:

Table 32 Net Safe Bearing Pressure (q_{ns}) based on Rock Classification

Sr No.	Material	q_{ns} (t/m^2)
1	Massive crystalline bedrock including granite, diarite, gnciss, trap rock	1000
2	Foliated rocks such as schist or slate in sound condition	400
3	Bedded limestone in sound condition	400
4	Sedimentary rock, including hard shales and sandstones	250
5	Soft or broken bedrock (excluding shale), and soft limestone	100
6	Soft shale	30

Reduction factors are to be applied on the above presumptive values for saturation and orientation of joints.

Based on Rock Core Strength (Clause 6, IS: 12070 – 1987):

As per IS 12070:1987, when the rock mass is sound and exhibits favorable characteristics, such as closed and favorably oriented discontinuities the safe bearing pressure (gross) for shallow foundations can be estimated using the uniaxial compressive strength of rock cores.

The methodology involves detailed identification and mapping of all discontinuities within the zone of influence of the foundation, along with evaluation of their mechanical behavior and the strength of the intact rock. If the rock surface is parallel to the base of the foundation and no tangential stress component exists, the safe bearing pressure (q_n) is determined by:

$$q_n = q_0 * N_j$$

Where:

- q_n = Safe bearing pressure (gross),
- q_o = Average uniaxial compressive strength of the rock core (MPa),
- N_j = Empirical coefficient based on spacing and condition of discontinuities

Rock Mass Rating (RMR) (Clause 5.3, IS: 12070 – 1987):

Analysis has been carried out using the RMR also known as Geo-mechanics classification by considering classification parameters and their ratings. Depending upon the quality of rock as assessed from the RMR values, the net safe bearing pressure are specified in IS: 12070 - 1987.

5.2 Load carrying Capacity Assessment of Pile Foundation

5.2.1 Pile Founded in Granular Soil

$$Q_u = A_p\left(1/2D\gamma N_\gamma + P_D N_q\right) + \sum_{i=1}^{n} K_i P_{Di} \tan\delta_i \, A_{si}$$

Where,

A_p = cross-sectional area of pile tip, in m^2
D = diameter of pile shaft, in m,
N_γ & N_q = bearing capacity factors depending upon the angle of internal friction, φ at pile tip,
P_D = effective overburden pressure at pile tip, in kN/m^2,
$\sum_{i=1}^{n}$ = summation for layers 1 to n in which pile is installed and which contribute to positive skin friction,
k_i = coefficient of earth pressure applicable for the ith layer,
P_{Di} = effective overburden pressure for the ith layer, in kN/m^2,
δ_i = angle of wall friction between pile and soil for the ith layer; and
A_{si} = surface area of pile shaft in the ith layer, in m^2,

The lateral load carrying capacity of pile has been computed based on Annex C of IS: 2911 (Part-I): 1979.

5.2.2 Pile Founded in Cohesive Soil

$$Q_u = A_p N_c c_p + \sum_{i=1}^{n} \alpha_i c_i A_{si}$$

A_p = cross-sectional area of pile tip, in m^2
D = diameter of pile shaft, in m,
N_c = bearing capacity factors, may be taken as 9,
C_p = average cohesion at pile tip, in kN/m^2,
C_i = average cohesion for the i^{th} layer, in kN/m^2,
$\sum_{i=1}^{n}$ = summation for layers 1 to n in which pile is installed and which contribute to positive skin friction,
α_i = adhesion factor depending on the consistency of soil for the i^{th} layer,
A_{si} = surface area of pile shaft in the ith layer, in m^2,

5.2.3 Bored Pile Socketed into Rock

The capacity of bored piles socketed into the rock has been computed in general accordance with IRC: 78-2014. The skin friction contribution above socket has been ignored. The total capacity of the pile is computed as the end bearing of the rock at the base plus the side socket shear along the length of the socket. The Methods used is as follows:

Method: 1

$$Q_u = R_e + R_{af} = K_{sp} * q_c * d_f * A_b + A_c * C_{us}$$

$$Q_{allow} = (R_e/3) + (R_{af}/6)$$

Q_u = Ultimate capacity of pile socketed into rock

Q_{allow} = Allowable capacity of pile

R_e = Ultimate end bearing

R_{af} = Ultimate side socket shear

K_{sp} = An empirical co-efficient whose value ranges from 0.3 to 1.2 as per the table below for the rocks where core recovery is reported, and cores tested for uniaxial compressive strength.

(CR+RQD)/2	K_{sp}
30%	0.30
100%	1.20

*** For intermediate values, K_{sp} shall be linearly interpolated.**

CR = Core recovery in %

RQD = Rock Quality Designation in % For intermediate values,

q_c = Average unconfined compressive strength of rock core below base of pile for the depth twice the diameter/least lateral dimensions of pile.

A_b = Cross-sectional area of base of pile.

D_f = Depth factor = 1+0.4 x Length of socket/dia of socket (not greater than 1.2).

A_s = Surface area of socket.

C_{us} = Ultimate shear strength along socket length=0.225√qc (restricted to shear capacity of concrete of the pile, to be taken as 3 MPa for M35 concrete).

Method: 2

This method is applicable when cores and/or core testing result are not available, or when geo-material is highly fragmented.

The shear strength of geo-material is obtained from its correlation with extrapolated SPT values for 300 mm of penetration as given in table below:

Shear Strength/Consistency	Moderately Weak	Weak	Very Weak
Approx. N Value	300 – 200	200 – 100	100 - 60
Shear Strength/Cohesion in MPa	3.3 – 1.9	1.9 – 0.7	0.7 – 0.4

$$Q_u = R_e + R_{af} = c_{ub} * N_c * A_b + A_c * C_{us}$$

$$Q_{allow} = (R_e/3) + (R_{af}/6)$$

Q_u = Ultimate capacity of pile socketed into rock

Q_{allow} = Allowable capacity of pile

R_e = Ultimate end bearing

R_{af} = Ultimate side socket shear

C_{ub} = Average shear strength below base of pile, for the depth equal to twice the diameter/least lateral dimension of pile, based on average 'N' value of this region.

C_{us} = Ultimate shear strength along socket length, to be obtained from table, based on average 'N' value of socket portion. This shall be restricted to shear capacity of concrete of the pile, to be taken as 3.0 MPa for M35 concrete in confined condition, which for other strengths of concrete can be modified by a factor $(f_{ck}/35)^{1/2}$ Intermediate values c_{ub} and c_{us} can be interpolated linearly.

A_s = Surface area of socket

N_c = 9

The extrapolated values of 'N' greater than 300 shall be limited to 300 while using this method. The lateral load carrying capacity of pile has been computed based on Annex C of IS: 2911 (Part-I): 1979.

5.2.4 Pile Founded in Weathered/Soft Rock

For pile founded in weathered/soft rock different empirical approaches are used to arrive at the socket length necessary for utilizing the full structural capacity of the pile. Since it is difficult to collect cores in weathered/soft rocks, the method suggested by Cole and Stroud using ‘N’ values is more widely used. The allowable load on the pile, Qa, in KN, by this approach, is given by

$$Qa = cu1Nc.\frac{\pi B2}{4Fs} + \alpha cu2.\frac{\pi BL}{Fs}$$

Where,

cu1 = Shear strength of rock below the base of the pile, in kN/m^2.
Nc = Bearing capacity factor taken as 9;
Fs = Factor of safety usually taken as 3;
A = 0.9 (recommended value);
cu2 = Average shear strength of rock in the socketed length of pile, in KN/m^2;

6 SEISMICITY AND TECTONIC SETTING

6.1 Earthquake History of the Region

The project area, located in Noida within the National Capital Region (NCR), has experienced seismic activity influenced primarily by the tectonic movements of the Himalayan region and associated fault systems.

Historically, several moderate to strong earthquakes have affected the Delhi–NCR region and surrounding areas. Although no major earthquake epicenter is located directly within Noida, the region has experienced ground shaking due to earthquakes originating from the Himalayan belt and nearby tectonic features.

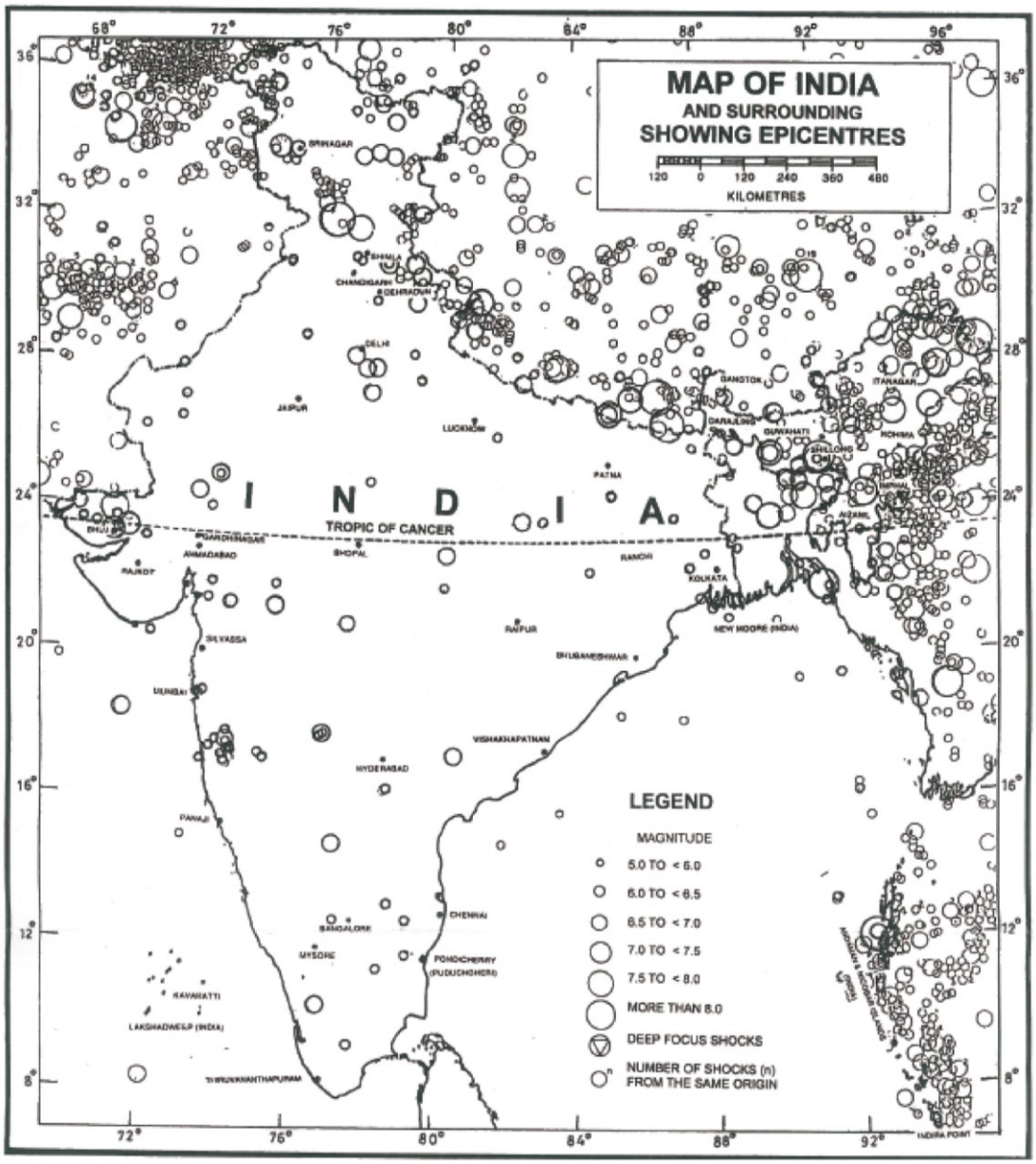


Figure 19 Epicentres of Past Earthquakes in India (Annex A, IS 1893 (Part-1) 2016)

Some of the notable earthquakes affecting the region include:

- **1905 Kangra Earthquake (Mw ~7.8)** – One of the most destructive earthquakes in northern India
- **1934 Bihar–Nepal Earthquake (Mw ~8.1)** – Caused widespread damage across northern India
- **1991 Uttarkashi Earthquake (Mw ~6.8)**
- **1999 Chamoli Earthquake (Mw ~6.6)**
- **2015 Nepal Earthquake (Mw ~7.8)** – Felt significantly in Delhi–NCR

In addition, the Delhi–NCR region has experienced several minor to moderate magnitude earthquakes in recent years, indicating continuous tectonic activity.

Based on seismic zoning as per IS 1893 (Part 1): 2016, the project area falls under **Seismic Zone IV**, indicating a region of high seismic risk.

6.2 Faulting and Tectonic Features

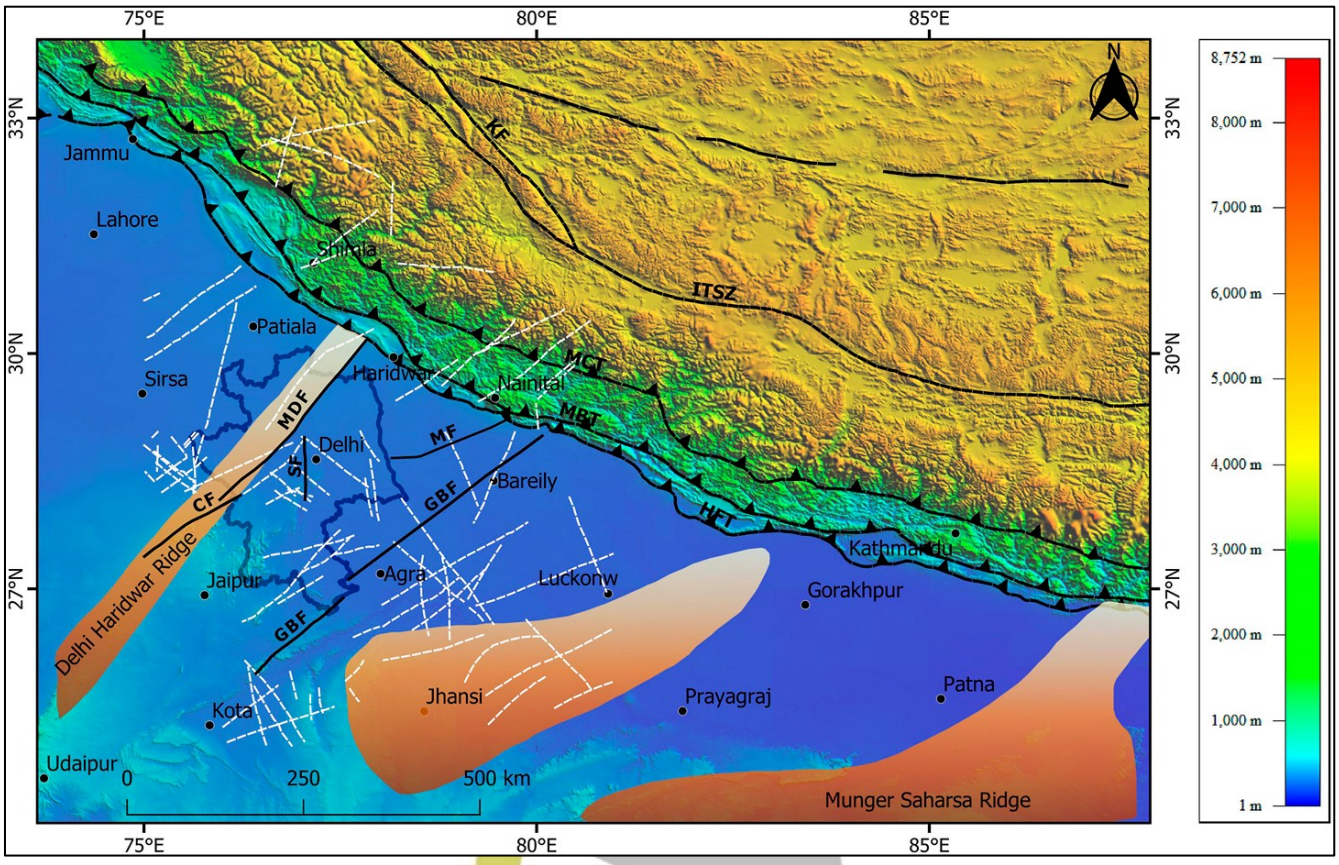
The project corridor lies within the Indo-Gangetic alluvial plains and is not directly located on any known major active surface fault. However, the region is influenced by several regional tectonic features associated with the Himalayan seismic system.

The major tectonic features influencing the Delhi–NCR region include:

- **Mahendragarh–Dehradun Fault (MDF)**
- **Delhi–Haridwar Ridge (DHR)**
- **Yamuna Tear Fault (YTF)**
- **Main Boundary Thrust (MBT)**
- **Main Central Thrust (MCT)**

These tectonic features are located at varying distances from the project site and contribute to the regional seismicity.

The Yamuna River alignment is also associated with geomorphic lineaments, which may indicate minor tectonic controls; however, no evidence of active surface faulting has been observed within the project alignment.



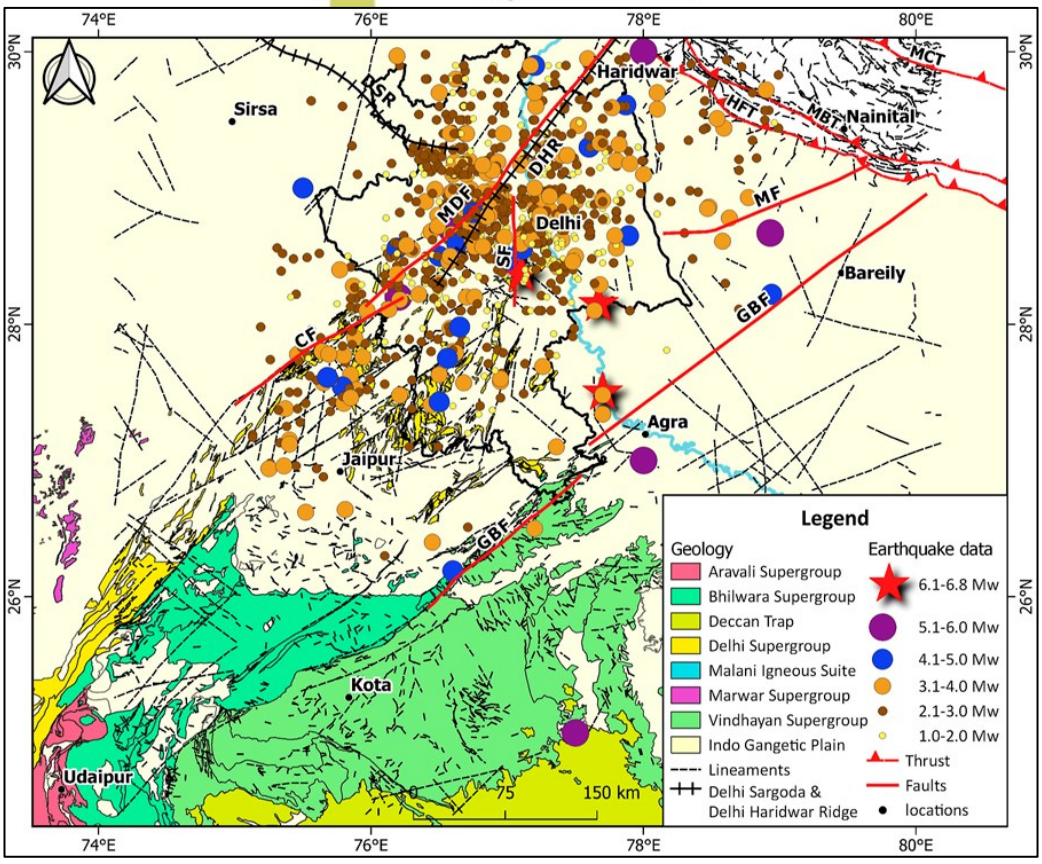


Figure 20 Major Tectonic Features of Delhi NCR

7 LIQUEFACTION POTENTIAL ASSESSMENT

7.1 Liquefaction Susceptibility Assessment

Liquefaction refers to the transition of a granular material from a solid to a liquefied state due to elevated pore-water pressure and decreased effective stress (Marcuson 1978[1]). The rise in pore pressure can be triggered by the tendency of granular materials to consolidate during cyclic shear deformation, such as during an earthquake.

The liquefaction potential at the site has been evaluated in accordance with Annex F of IS 1893 (Part 1): 2016. A brief description of the adopted methodology is presented in Section 7.2 below.

7.2 Methodology of Liquefaction Potential Assessment

7.2.1 Determination of Seismic Parameters

Seismic Zone Factor (Z): Based on the location as per IS 1893 seismic zoning map.
Importance Factor (I): Depends on the structure type (usually 1.0 to 1.5).
Response Reduction Factor (R): Based on structural system.
Design horizontal seismic coefficient (A_h):

$$A_h = \frac{z}{2} x \frac{I}{R}$$

Peak Ground Acceleration (PGA): $a_{max} = A_h \times g$

7.2.2 Determination of Vertical Stresses

At the depth of interest:

- Total vertical stress (σ_v):

$$\sigma_v = \gamma \times H$$

- Pore water pressure (u):

$$u = \gamma_w \times H_w$$

- Effective vertical stress (σ'_v):

$$\sigma'_v = \sigma_v - u$$

7.2.3 Stress Reduction Factor (r_d)

Accounts for flexibility and depth effects.

$$r_d = 1 - 0.00765_z \ (0 < z < 9.15m)$$

$$r_d = 1.174 - 0.0267_z \ (9.15m < z < 23.0m)$$

[1] Marcuson, W.F. (III) (1978), "***Definition of terms related to liquefaction***", J. Geotech Engg. Div, ASCE, 104(9), 1197-1200.

Typical values (as per Seed & Idriss, 1971 or empirical charts in IS 1893):

- 1.0 at surface
- 0.9 at 5 m
- 0.7 at 10 m
- 0.5 at 20 m

7.2.4 Calculation of Cyclic Stress Ratio (CSR)

$$CSR = 0.65\ x \frac{a_{max}}{g}\ x\ \frac{\sigma_v}{\sigma_{v'}}\ x\ r_d$$

Where

α_{max} = Peak ground acceleration (PGA) preferably in terms of g.

g = Acceleration due to gravity,

r_d = Stress reduction factor,

0.65 is a stress reduction coefficient for irregular cyclic loading. If value of PGA is not available, the ratio of (α_{max}/g) is taken equal to seismic zone factor as per Table 3, IS 1893 (Part-1): 2016.

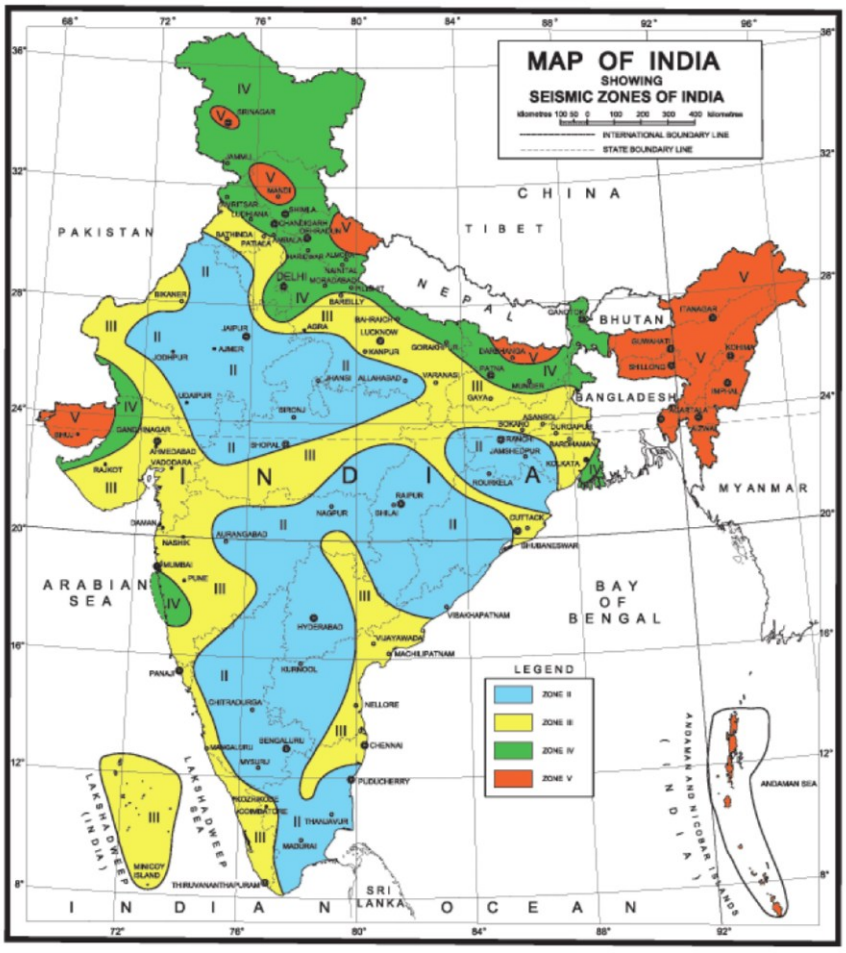


Figure 21 Seismic Zones of India (Figure-1, IS 1893 (Part-1) 2016)

7.2.5 Evaluation of Soil Resistance: Cyclic Resistance Ratio (CRR)

$$CRR = CRR_{7.5} \times MSF \times K_{\sigma} \times K_{\alpha}$$

Where

$CRR_{7.5}$ (standard cyclic ratio for 7.5 magnitude earthquake, calculated based on SPT N-value,

Based on corrected SPT N-values ($(N_1)_{60}$).

Corrections to SPT N-value:

$$(N_1)_{60} = N \times C_N \times C_E \times C_B \times C_R \times C_S$$

Where:

- C_N: Overburden correction factor,

$$C_N = \left(\frac{P_a}{\sigma'_v}\right)^{0.5}$$

- P_a: atmospheric pressure (≈100 kPa).
- C_E: Energy correction factor
- C_B: Borehole diameter correction factor
- C_R: Rod length correction factor
- C_S: Sampler correction factor

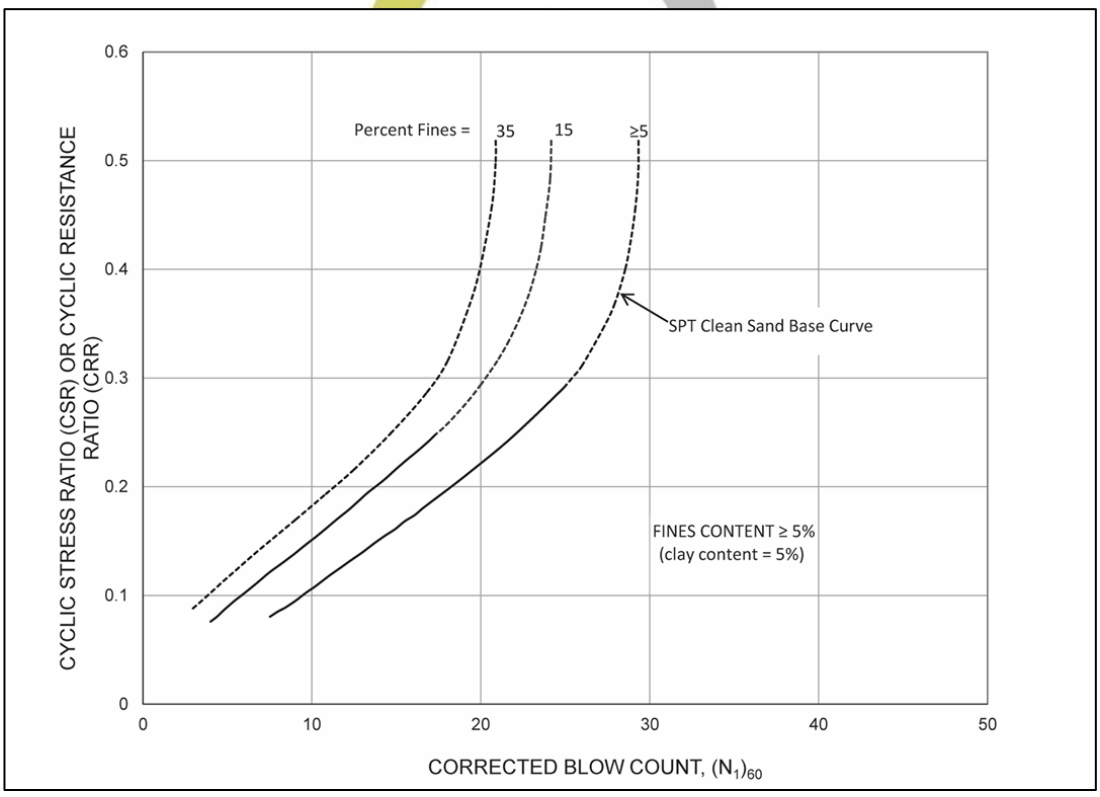


Figure 22 Relation Between $CRR_{7.5}$ and $(N_{1(60)})$ (Fig.8, Annex F, IS 1893 (Part-1): 2016)

Empirical CRR values for clean sands are obtained using Seed et al. (1985) charts for magnitude 7.5. Corrections for fines content are applied if necessary.

7.2.6 Magnitude Scaling Factor (MSF)

CRR values are valid for magnitude 7.5. To adjust for actual magnitude M_w:

$$MSF = 10^{[2.24/(M_w+2.56)]}$$

7.2.7 Overburden Stress Correction (K_σ)

$$K_\sigma = \left(\frac{\sigma'_{v0}}{P_a}\right)^{(f-1)}$$

Where,

K_σ = Overburden correction factor

σ'_{v0} = Effective vertical overburden stress

P_a = Atmospheric pressure (≈ 100 kPa)

f = Exponent depending on relative density / soil type

7.2.8 Static Shear Stress Correction (K_α)

The static shear stress correction is applicable sloping ground only, therefore the value Kα is considered unity.

7.2.9 Factor of Safety Against Liquefaction

$$\frac{CRR_M}{CSR}$$

Interpretation:

- FS ≥ 1.2: Liquefaction unlikely.
- FS < 1.0: Liquefaction potential exists; mitigation required.

7.2.10 Post-Liquefaction Effects

If FS < 1.0, evaluate:

- Settlements due to reconsolidation (using empirical relations such as Tokimatsu and Seed, or Ishihara & Yoshimine).
- Lateral spreading potential, especially near slopes, rivers, or free faces.

7.2.11 Consideration of Parameters for Liquefaction Assessment

The following information has been considered in the Liquefaction calculation

- Noida, Uttar Pradesh (Zone IV [IS-1893 Part-1: 2016 / Fig. 1]
- Peak Ground Acceleration = 0.24 [IS-1893 Part-1: 2016 / table: 3]
- Magnitude of Earthquake = 7.5 to 8.0 [IS-1893 Part-1: 2016 / Annex: 1]

7.3 Results of Liquefaction Analysis

The liquefaction assessment has been carried out for each borehole along the alignment in accordance with Annex F of IS 1893 (Part 1): 2016, as briefly methodology described in Section 7.2 of this report. The seismic parameters have been adopted as defined in Section 7.2.11. For a conservative evaluation, the groundwater level has been assumed at ground level; however, during the field investigation (December 2025 to March 2026), the groundwater table was observed to vary between approximately 9.0 m and 14.0 m below existing ground level (OGL).

The zone-wise maximum depth of liquefiable soil is summarized in the table below, while the detailed results of the liquefaction assessment are presented in Appendix B of this report.

Table 33 Summary of Liquefiable Soil Depth

Zone	Chainage (km)	Boreholes	Predominant Soil	Maximum Liquefiable Soil Depth (M)	Average Liquefiable Soil Depth (M)	Remarks
Zone 1	0-380 to 0+500	BH-(-02) to BH-(-10)	SM	7.00	5.90	BH-(-05) & (-07)
Zone 2	0+500 to 1+450	BH-01 to BH-09	SM	7.00	5.30	BH-02 & 05
Zone 3	1+450 to 2+515	BH-11 to BH-20A	SM + ML	8.50	5.00	BH-14
Zone 4	2+515 to 3+515	BH-21 to BH-30	ML Dominant	7.00	4.50	BH-28
Zone 5	3+515 to 4+520	BH-31 to BH-40	SM + ML	5.50	3.50	BH-34 & 35
Zone 6	4+520 to 5+000	BH-41 to BH-50	SM	5.50	2.50	BH-45A
Zone 7	5+000 to 6+000	BH-51 to BH-60	SM + ML	5.50	3.50	BH-56
Zone 8	6+000 to 7+000	BH-61 to BH-70	ML + SM	7.00	4.00	BH-70
Zone 9	7+000 to 8+000	BH-71 to BH-80	SM + ML	7.00	5.00	BH-77
Zone 10	8+000 to 9+000	BH-82 to BH-89	SM	7.00	5.50	BH-84 & 89
Zone 11	9+000 to 10+000	BH-91 to BH-100	SM + ML	11.50	5.50	BH-98
Zone 12	10+000 to 11+000	BH-101 to BH-109	SM + ML + CL	8.50	4.70	BH-102
Zone 13	11+000 to 12+130	BH-111 to BH-116	SM + ML	8.50	5.20	BH-112

Note: Remarks indicate boreholes with greater estimated liquefiable depth within the zone.

Intermediate liquefiable strata are observed in select boreholes between depths of 10.0 m and 25.0 m, as detailed in Appendix B. In view of the potential reduction in effective stress and shear strength under liquefaction conditions, these layers have been treated as non-contributing strata. Accordingly, the positive shaft resistance and end bearing from these zones have not been considered in the pile

capacity evaluation. This approach ensures a conservative estimation of pile performance under adverse subsurface conditions.

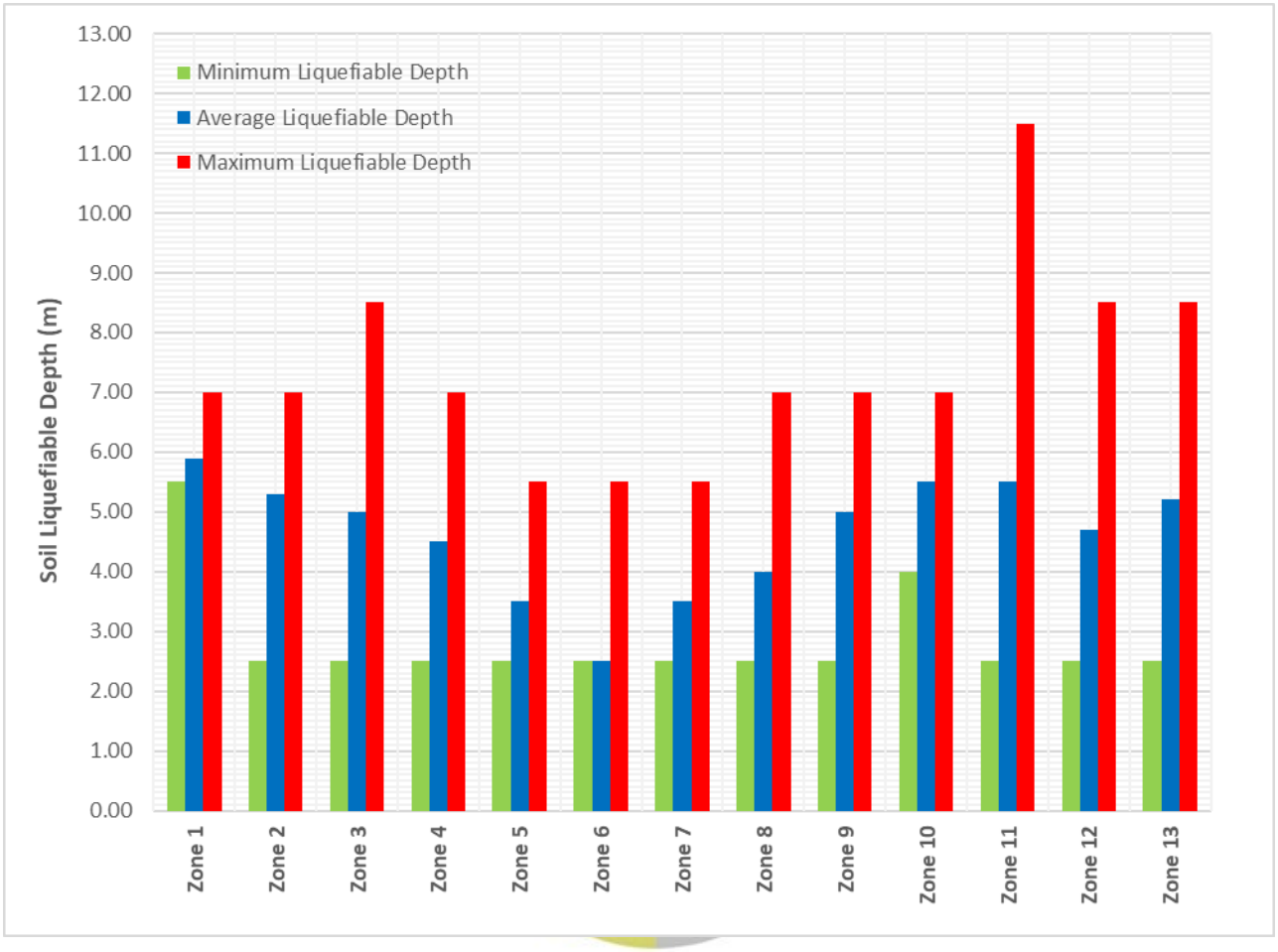


Figure 23 Summary of Liquefiable Soil Depth within the Zone

8 FOUNDATION RECOMMENDATIONS

Based on the geotechnical investigation, the subsurface profile along the alignment predominantly comprises silty sand (SM) with varying density and interbedded silt/clay layers, with dense to very dense strata at deeper levels. Considering the nature of the proposed elevated viaduct structures and variability in intermediate layers, **Pile Foundations** are recommended throughout the alignment.

8.1 Pile Design Considerations

The pile design shall consider the combined contribution of end bearing resistance in the dense to very dense strata and skin friction resistance along the pile shaft. Appropriate reduction in shaft resistance shall be accounted for within weaker strata such as inorganic silt (ML) layers and any potentially liquefiable layers, if present.

The piles shall be designed in accordance with the provisions of IS 2911 (Pile Foundations) as brief explained in Section 5.2.1 & 5.2.2 of this report.

The stratigraphy and geotechnical parameters derived from field investigations and laboratory testing have been conservatively adopted for the estimation of pile load capacities under compression, uplift (pull-out), and lateral loading conditions.

The assessment has been carried out considering two scenarios as suggested by DDC:

(i) groundwater level at ground level for conservative evaluation, and

(ii) groundwater level as encountered during the investigation.

The zone-wise summary of pile capacities for 1.0 m and 1.20 m diameter piles at a depth of 30.0 m below existing ground level (OGL) is presented below, while the detailed pile capacity summary with sample calculations is provided in Appendix A of this report.

Table 34 Summary of Pile Capacity

Zone	Chainage (km)	Boreholes	Diameter of Pile (m)	CASE_1 GW at Encountered Level		CASE_2 GW at Ground Level	
				Maximum Pile Axial Capacity (Tonne)	Minimum Pile Axial Capacity (Tonne)	Maximum Pile Axial Capacity (Tonne)	Minimum Pile Axial Capacity (Tonne)
Zone 1	0-380 to 0+500	BH-(-02) to BH-(-10)	1.00	421	396	202	185
			1.20	608	575	323	304
Zone 2	0+500 to 1+450	BH-01 to BH-09	1.00	442	380	221	182
			1.20	682	546	375	294
Zone 3	1+450 to 2+515	BH-11 to BH-20A	1.00	438	402	220	187
			1.20	632	407	407	296
Zone 4	2+515 to 3+515	BH-21 to BH-30	1.00	468	395	227	192
			1.20	697	567	357	308
Zone 5	3+515 to 4+520	BH-31 to BH-40	1.00	467	417	231	201
			1.20	657	452	391	283
Zone 6	4+520 to 5+000	BH-41 to BH-50	1.00	462	381	228	189
			1.20	605	552	356	298
Zone 7	5+000 to 6+000	BH-51 to BH-60	1.00	439	376	233	194
			1.20	632	423	371	334
Zone 8	6+000 to 7+000	BH-61 to BH-70	1.00	370	253	239	187
			1.20	538	434	372	281
Zone 9	7+000 to 8+000	BH-71 to BH-80	1.00	433	362	229	181
			1.20	618	515	361	283
Zone 10	8+000 to 9+000	BH-82 to BH-89	1.00	434	398	213	185
			1.20	652	558	340	285

Zone	Chainage (km)	Boreholes	Diameter of Pile (m)	CASE_1 GW at Encountered Level		CASE_2 GW at Ground Level	
				Maximum Pile Axial Capacity (Tonne)	Minimum Pile Axial Capacity (Tonne)	Maximum Pile Axial Capacity (Tonne)	Minimum Pile Axial Capacity (Tonne)
Zone 11	9+000 to 10+000	BH-91 to BH-100	1.00	426	356	207	168
			1.20	608	504	329	271
Zone 12	10+000 to 11+000	BH-101 to BH-109	1.00	432	368	213	189
			1.20	617	528	336	298
Zone 13	11+000 to 12+130	BH-111 to BH-116	1.00	437	386	219	184
			1.20	620	554	340	294

The following points are highlighted with respect to the recommended pile capacities:

- The pile capacities stated above are intended for preliminary design purposes only. These should be verified through initial pile load tests conducted in accordance with IS: 2911 (Part IV), latest edition.
- Pile Integrity Tests (PIT) shall be carried out on selected working piles to evaluate the quality and continuity of pile construction.
- Pile load tests (initial and/or routine) shall be performed to validate the assumed load-carrying capacities, particularly for piles socketed in heterogeneous or variable rock strata.

8.2 Recommendation for Cement/Concrete

The chemical test results of the soil sample and ground water sample are presented in Appendix C of the report.

Based on the sulphate concentration in the soil and groundwater, the site is majorly classified as Class 2. Accordingly, minimum cement content = 330 kg/m³ and maximum water–cement ratio = 0.50 (Table 4, IS 456:2000).

For bored cast-in-situ piles, the minimum concrete grade shall be M25 and minimum cement content = 400 kg/m³ (Clause 7.3.3, IS 2911 (Part 1/Sec 2):2010). Use of Portland Pozzolana Cement (PPC) or Portland Slag Cement (PSC) is suggested.

The minimum cement content and maximum w/c ratio given in Table 4 of IS 456:2000 are durability requirements and apply irrespective of cement grade (OPC 33/43/53, PPC, PSC, etc.); these provisions are applicable to concrete grades M15 and above, since durability cannot be ensured for lower-strength concretes.

9 CONCLUSION

Total of 122 boreholes drilled at the proposed site. The subsurface stratigraphy is briefly described in Section 4.1, while the detailed stratigraphy along with test results is presented in Appendix C.

Based on the geotechnical investigation carried out along the proposed alignment from Sector-142 to Botanical Garden, Noida, the subsurface conditions are predominantly characterized by alluvial deposits comprising silty sand (SM) with varying density, interbedded with inorganic silt (ML). The stratification exhibits variability in the intermediate depth range, while the deeper strata generally consist of dense to very dense silty sand forming a competent bearing layer.

The alignment has been categorized into different zones based on borehole locations and chainage (Section 4.1), reflecting variations in stratigraphy and engineering behavior. The geotechnical parameters have been derived from field and laboratory investigations (Section 4.2) and have been adopted conservatively for design purposes.

Liquefaction assessment (Section 7.0) has been carried out in accordance with relevant provisions of IS 1893 (Part 1): 2016. The results indicate that certain stretches with loose to medium dense sandy strata below groundwater level may exhibit liquefaction susceptibility under seismic loading; however, the presence of dense to very dense strata at greater depths provides a suitable founding layer for deep foundations.

Considering the nature of the proposed elevated viaduct structures and the prevailing subsurface conditions, pile foundations are recommended throughout the alignment. The piles shall be founded in dense to very dense strata to ensure adequate load-bearing capacity and controlled settlement. The contribution of weaker and potentially liquefiable layers has been appropriately considered in the assessment of pile capacity (Section 8.0).

The geotechnical parameters and pile capacities presented in this report are suitable for preliminary design. Final foundation design shall be carried out during the detailed design stage, considering site-specific loading conditions, construction methodology, and relevant codes and standards.

Appendix A Summary of Pile Load Carrying Capacity

A.1. Zone 1: CH: 0-380 km to 0+500 km (BH-(-02) to BH-(-10))

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-(-02)	1.00	22.00	19.50	16.50	301.37	136.20	10.75	2.69	141.36	75.19	10.75	2.69
BH-(-02)	1.00	23.50	21.00	18.00	320.72	151.40	11.04	2.76	150.52	83.25	11.04	2.76
BH-(-02)	1.00	25.00	22.50	19.50	340.07	166.59	11.40	2.85	159.67	91.30	11.40	2.85
BH-(-02)	1.00	26.50	24.00	21.00	359.43	181.79	11.70	2.93	168.82	99.36	11.70	2.93
BH-(-02)	1.00	28.00	25.50	22.50	378.78	196.98	11.96	2.99	177.97	107.41	11.96	2.99
BH-(-02)	1.00	29.50	27.00	24.00	398.13	212.18	12.17	3.04	187.12	115.47	12.17	3.04
BH-(-02)	1.00	30.00	27.50	24.50	404.58	217.24	12.35	3.09	190.17	118.16	12.35	3.09
BH-(-02)	1.20	22.00	19.50	16.50	441.90	179.23	13.96	3.49	232.40	106.02	13.96	3.49
BH-(-02)	1.20	23.50	21.00	18.00	468.75	200.41	14.34	3.58	247.02	118.63	14.34	3.58
BH-(-02)	1.20	25.00	22.50	19.50	495.61	221.58	14.80	3.70	261.64	131.24	14.80	3.70
BH-(-02)	1.20	26.50	24.00	21.00	522.46	242.76	15.20	3.80	276.25	143.84	15.20	3.80
BH-(-02)	1.20	28.00	25.50	22.50	549.32	263.93	15.53	3.88	290.87	156.45	15.53	3.88
BH-(-02)	1.20	29.50	27.00	24.00	576.18	285.11	15.81	3.95	305.49	169.06	15.81	3.95
BH-(-02)	1.20	30.00	27.50	24.50	585.13	292.16	16.04	4.01	310.36	173.26	16.04	4.01
BH-(-03)	1.00	22.00	19.50	16.50	303.99	136.14	10.42	2.60	145.93	76.49	10.42	2.60
BH-(-03)	1.00	23.50	21.00	18.00	323.72	151.60	10.74	2.69	155.46	84.81	10.74	2.69
BH-(-03)	1.00	25.00	22.50	19.50	343.45	167.06	11.12	2.78	164.99	93.13	11.12	2.78
BH-(-03)	1.00	26.50	24.00	21.00	363.18	182.52	11.45	2.86	174.52	101.46	11.45	2.86
BH-(-03)	1.00	28.00	25.50	22.50	382.91	197.98	11.72	2.93	184.05	109.78	11.72	2.93
BH-(-03)	1.00	29.50	27.00	24.00	402.64	213.44	11.95	2.99	193.58	118.10	11.95	2.99
BH-(-03)	1.00	30.00	27.50	24.50	409.22	218.60	12.14	3.03	196.76	120.87	12.14	3.03

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-(-03)	1.20	22.00	19.50	16.50	443.26	178.53	13.54	3.38	236.10	106.95	13.54	3.38
BH-(-03)	1.20	23.50	21.00	18.00	470.39	199.90	13.95	3.49	250.99	119.75	13.95	3.49
BH-(-03)	1.20	25.00	22.50	19.50	497.53	221.27	14.45	3.61	265.89	132.55	14.45	3.61
BH-(-03)	1.20	26.50	24.00	21.00	524.66	242.63	14.87	3.72	280.78	145.35	14.87	3.72
BH-(-03)	1.20	28.00	25.50	22.50	551.79	264.00	15.22	3.81	295.67	158.15	15.22	3.81
BH-(-03)	1.20	29.50	27.00	24.00	578.92	285.37	15.52	3.88	310.57	170.95	15.52	3.88
BH-(-03)	1.20	30.00	27.50	24.50	587.97	292.49	15.77	3.94	315.53	175.22	15.77	3.94
BH-(-05)	1.00	22.00	19.50	15.00	306.58	136.25	10.87	2.72	149.54	77.31	10.87	2.72
BH-(-05)	1.00	23.50	21.00	16.50	326.66	151.95	11.10	2.78	159.41	85.87	11.10	2.78
BH-(-05)	1.00	25.00	22.50	18.00	346.73	167.65	11.51	2.88	169.28	94.43	11.51	2.88
BH-(-05)	1.00	26.50	24.00	19.50	366.80	183.35	11.86	2.97	179.16	102.99	11.86	2.97
BH-(-05)	1.00	28.00	25.50	21.00	386.87	199.04	12.15	3.04	189.03	111.55	12.15	3.04
BH-(-05)	1.00	29.50	27.00	22.50	406.94	214.74	12.40	3.10	198.90	120.11	12.40	3.10
BH-(-05)	1.00	30.00	27.50	23.00	413.63	219.98	12.61	3.15	202.19	122.97	12.61	3.15
BH-(-05)	1.20	22.00	19.50	15.00	447.07	178.74	14.14	3.53	241.13	108.02	14.14	3.53
BH-(-05)	1.20	23.50	21.00	16.50	474.61	200.39	14.44	3.61	256.44	121.10	14.44	3.61
BH-(-05)	1.20	25.00	22.50	18.00	502.16	222.05	14.98	3.74	271.74	134.19	14.98	3.74
BH-(-05)	1.20	26.50	24.00	19.50	529.70	243.70	15.44	3.86	287.04	147.28	15.44	3.86
BH-(-05)	1.20	28.00	25.50	21.00	557.24	265.36	15.82	3.95	302.35	160.37	15.82	3.95
BH-(-05)	1.20	29.50	27.00	22.50	584.78	287.01	16.14	4.04	317.65	173.45	16.14	4.04
BH-(-05)	1.20	30.00	27.50	23.00	593.97	294.23	16.41	4.10	322.75	177.82	16.41	4.10
BH-(-06)	1.00	22.00	19.50	16.50	301.35	134.73	10.59	2.65	143.65	75.34	10.59	2.65
BH-(-06)	1.00	23.50	21.00	18.00	320.99	150.13	10.78	2.70	153.09	83.60	10.78	2.70
BH-(-06)	1.00	25.00	22.50	19.50	340.63	165.53	11.17	2.79	162.53	91.86	11.17	2.79
BH-(-06)	1.00	26.50	24.00	21.00	360.27	180.93	11.49	2.87	171.97	100.12	11.49	2.87
BH-(-06)	1.00	28.00	25.50	22.50	379.91	196.33	11.77	2.94	181.41	108.37	11.77	2.94
BH-(-06)	1.00	29.50	27.00	24.00	399.55	211.72	12.00	3.00	190.85	116.63	12.00	3.00

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-(-06)	1.00	30.00	27.50	24.50	406.10	216.86	12.19	3.05	194.00	119.39	12.19	3.05
BH-(-06)	1.20	22.00	19.50	16.50	442.15	177.33	13.76	3.44	235.43	106.05	13.76	3.44
BH-(-06)	1.20	23.50	21.00	18.00	469.35	198.74	14.00	3.50	250.39	118.90	14.00	3.50
BH-(-06)	1.20	25.00	22.50	19.50	496.56	220.16	14.51	3.63	265.35	131.75	14.51	3.63
BH-(-06)	1.20	26.50	24.00	21.00	523.76	241.58	14.93	3.73	280.32	144.60	14.93	3.73
BH-(-06)	1.20	28.00	25.50	22.50	550.97	263.00	15.29	3.82	295.28	157.45	15.29	3.82
BH-(-06)	1.20	29.50	27.00	24.00	578.17	284.41	15.59	3.90	310.25	170.30	15.59	3.90
BH-(-06)	1.20	30.00	27.50	24.50	587.24	291.55	15.84	3.96	315.24	174.59	15.84	3.96
BH-(-08)	1.00	22.00	19.50	16.50	298.91	135.26	10.89	2.72	139.29	74.52	10.89	2.72
BH-(-08)	1.00	23.50	21.00	18.00	318.10	150.34	11.17	2.79	148.28	82.47	11.17	2.79
BH-(-08)	1.00	25.00	22.50	19.50	337.30	165.43	11.52	2.88	157.28	90.41	11.52	2.88
BH-(-08)	1.00	26.50	24.00	21.00	356.49	180.51	11.82	2.95	166.28	98.36	11.82	2.95
BH-(-08)	1.00	28.00	25.50	22.50	375.69	195.60	12.06	3.02	175.27	106.30	12.06	3.02
BH-(-08)	1.00	29.50	27.00	24.00	394.88	210.69	12.27	3.07	184.27	114.25	12.27	3.07
BH-(-08)	1.00	30.00	27.50	24.50	401.28	215.71	12.44	3.11	187.27	116.90	12.44	3.11
BH-(-08)	1.20	22.00	19.50	16.50	438.58	178.04	14.15	3.54	229.55	105.15	14.15	3.54
BH-(-08)	1.20	23.50	21.00	18.00	465.25	199.08	14.51	3.63	243.98	117.63	14.51	3.63
BH-(-08)	1.20	25.00	22.50	19.50	491.92	220.12	14.96	3.74	258.41	130.10	14.96	3.74
BH-(-08)	1.20	26.50	24.00	21.00	518.59	241.17	15.35	3.84	272.84	142.58	15.35	3.84
BH-(-08)	1.20	28.00	25.50	22.50	545.26	262.21	15.67	3.92	287.27	155.05	15.67	3.92
BH-(-08)	1.20	29.50	27.00	24.00	571.92	283.25	15.94	3.99	301.70	167.53	15.94	3.99
BH-(-08)	1.20	30.00	27.50	24.50	580.81	290.27	16.17	4.04	306.51	171.69	16.17	4.04
BH-(-09)	1.00	22.00	19.50	16.50	293.86	131.65	10.36	2.59	136.94	72.80	10.36	2.59
BH-(-09)	1.00	23.50	21.00	18.00	313.07	146.74	10.75	2.69	145.95	80.75	10.75	2.69
BH-(-09)	1.00	25.00	22.50	19.50	332.28	161.84	11.14	2.79	154.96	88.71	11.14	2.79
BH-(-09)	1.00	26.50	24.00	21.00	351.49	176.94	11.48	2.87	163.97	96.67	11.48	2.87
BH-(-09)	1.00	28.00	25.50	22.50	370.70	192.03	11.76	2.94	172.98	104.63	11.76	2.94

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-(-09)	1.00	29.50	27.00	24.00	389.91	207.13	12.00	3.00	181.99	112.58	12.00	3.00
BH-(-09)	1.00	30.00	27.50	24.50	396.31	212.16	12.20	3.05	184.99	115.23	12.20	3.05
BH-(-09)	1.20	22.00	19.50	16.50	432.43	173.62	13.46	3.37	226.63	103.00	13.46	3.37
BH-(-09)	1.20	23.50	21.00	18.00	459.11	194.68	13.97	3.49	241.08	115.49	13.97	3.49
BH-(-09)	1.20	25.00	22.50	19.50	485.80	215.73	14.48	3.62	255.53	127.98	14.48	3.62
BH-(-09)	1.20	26.50	24.00	21.00	512.49	236.79	14.91	3.73	269.98	140.47	14.91	3.73
BH-(-09)	1.20	28.00	25.50	22.50	539.17	257.84	15.28	3.82	284.42	152.95	15.28	3.82
BH-(-09)	1.20	29.50	27.00	24.00	565.86	278.90	15.59	3.90	298.87	165.44	15.59	3.90
BH-(-09)	1.20	30.00	27.50	24.50	574.76	285.92	15.85	3.96	303.69	169.61	15.85	3.96
BH-(-10)	1.00	22.00	19.50	15.00	311.16	136.47	11.22	2.80	136.76	72.68	11.22	2.80
BH-(-10)	1.00	23.50	21.00	16.50	331.82	152.59	11.49	2.87	145.77	80.63	11.49	2.87
BH-(-10)	1.00	25.00	22.50	18.00	352.49	168.70	11.87	2.97	154.78	88.59	11.87	2.97
BH-(-10)	1.00	26.50	24.00	19.50	373.16	184.82	12.19	3.05	163.79	96.55	12.19	3.05
BH-(-10)	1.00	28.00	25.50	21.00	393.83	200.94	12.45	3.11	172.80	104.50	12.45	3.11
BH-(-10)	1.00	29.50	27.00	22.50	414.49	217.05	12.67	3.17	181.81	112.46	12.67	3.17
BH-(-10)	1.00	30.00	27.50	23.00	421.38	222.43	12.86	3.21	184.82	115.11	12.86	3.21
BH-(-10)	1.20	22.00	19.50	15.00	455.93	179.58	14.59	3.65	226.67	103.02	14.59	3.65
BH-(-10)	1.20	23.50	21.00	16.50	484.36	201.86	14.95	3.74	241.11	115.51	14.95	3.74
BH-(-10)	1.20	25.00	22.50	18.00	512.80	224.14	15.44	3.86	255.56	128.00	15.44	3.86
BH-(-10)	1.20	26.50	24.00	19.50	541.23	246.42	15.86	3.96	270.01	140.49	15.86	3.96
BH-(-10)	1.20	28.00	25.50	21.00	569.67	268.70	16.20	4.05	284.46	152.98	16.20	4.05
BH-(-10)	1.20	29.50	27.00	22.50	598.10	290.98	16.50	4.12	298.90	165.47	16.50	4.12
BH-(-10)	1.20	30.00	27.50	23.00	607.58	298.40	16.73	4.18	303.72	169.63	16.73	4.18

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-02)	-
Chainage	0+499	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	195.37	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-02)	1.00	22.00	19.50	16.50	301.37	136.20	10.75	2.69
BH-(-02)	1.00	23.50	21.00	18.00	320.72	151.40	11.04	2.76
BH-(-02)	1.00	25.00	22.50	19.50	340.07	166.59	11.40	2.85
BH-(-02)	1.00	26.50	24.00	21.00	359.43	181.79	11.70	2.93
BH-(-02)	1.00	28.00	25.50	22.50	378.78	196.98	11.96	2.99
BH-(-02)	1.00	29.50	27.00	24.00	398.13	212.18	12.17	3.04
BH-(-02)	1.00	30.00	27.50	24.50	404.58	217.24	12.35	3.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.05	21	-	2.00	6.49	1.00	-	3.25	4.00	11.96	23.93	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	15.95	0.05	21	-	2.00	6.49	1.00	-	4.75	5.50	35.89	47.85	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.55	0.05	21	-	2.00	6.49	1.00	-	6.25	7.00	61.01	74.18	4.71	10.58	39.32	49.89	19.96	10.66
4	7.00	8.50	1.50	Granular	17.55	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	87.34	100.50	4.71	18.02	93.10	121.70	48.68	17.35
5	8.50	10.00	1.50	Granular	17.55	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	113.66	126.83	4.71	23.46	115.68	167.73	67.09	25.57
6	10.00	11.50	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	140.70	154.58	4.71	31.36	198.96	282.37	112.95	36.00
7	11.50	13.00	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	168.45	182.33	4.71	37.54	232.87	353.83	141.53	48.16
8	13.00	14.50	1.50	Granular	8.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	188.85	195.37	4.71	43.65	279.73	444.33	177.73	62.03
9	14.50	16.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	195.37	195.37	4.71	45.15	280.66	490.41	196.16	76.32
10	16.00	17.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	195.37	195.37	4.71	46.77	317.03	573.54	229.42	91.07
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	195.37	195.37	4.71	46.77	317.03	620.31	248.12	105.81
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	195.37	195.37	4.71	48.38	353.39	705.05	282.02	121.01
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	195.37	195.37	4.71	48.38	353.39	753.43	301.37	136.20
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	195.37	195.37	4.71	48.38	353.39	801.81	320.72	151.40
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	195.37	195.37	4.71	48.38	353.39	850.18	340.07	166.59
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	195.37	195.37	4.71	48.38	353.39	898.56	359.43	181.79
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	195.37	195.37	4.71	48.38	353.39	946.94	378.78	196.98
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	195.37	195.37	4.71	48.38	353.39	995.32	398.13	212.18
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	195.37	195.37	1.57	16.13	353.39	1011.44	404.58	217.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.744	10.75	2.69	36.97	17.15	25.79	6.45	88.72	41.15
2	22.50	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.181	0.725	11.04	2.76	37.63	17.46	26.49	6.62	90.31	41.90
3	24.00	21	2.96E+07	4.91E-02	2.96E+03	3.45	1.59	1.95	1.81	6.75	6.26	0.175	0.702	11.40	2.85	38.44	17.84	27.35	6.84	92.26	42.82
4	25.50	22	2.96E+07	4.91E-02	3.09E+03	3.42	1.61	1.95	1.81	6.69	6.21	0.171	0.684	11.70	2.93	39.13	18.17	28.09	7.02	93.90	43.60
5	27.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.96	2.99	39.69	18.43	28.70	7.17	95.25	44.24
6	28.50	23	2.96E+07	4.91E-02	3.28E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.657	12.17	3.04	40.17	18.66	29.22	7.30	96.40	44.79
7	30.00	24	2.96E+07	4.91E-02	3.36E+03	3.37	1.63	1.95	1.81	6.57	6.10	0.162	0.648	12.35	3.09	40.56	18.85	29.64	7.41	97.33	45.23

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-02)	-
Chainage	0+499	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	225.95	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-02)	1.20	22.00	19.50	16.50	441.90	179.23	13.96	3.49
BH-(-02)	1.20	23.50	21.00	18.00	468.75	200.41	14.34	3.58
BH-(-02)	1.20	25.00	22.50	19.50	495.61	221.58	14.80	3.70
BH-(-02)	1.20	26.50	24.00	21.00	522.46	242.76	15.20	3.80
BH-(-02)	1.20	28.00	25.50	22.50	549.32	263.93	15.53	3.88
BH-(-02)	1.20	29.50	27.00	24.00	576.18	285.11	15.81	3.95
BH-(-02)	1.20	30.00	27.50	24.50	585.13	292.16	16.04	4.01

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.05	21	-	2.00	6.49	1.00	-	3.25	4.00	11.96	23.93	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	15.95	0.05	21	-	2.00	6.49	1.00	-	4.75	5.50	35.89	47.85	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.55	0.05	21	-	2.00	6.49	1.00	-	6.25	7.00	61.01	74.18	5.65	12.69	57.01	69.71	27.88	14.64
4	7.00	8.50	1.50	Granular	17.55	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	87.34	100.50	5.65	21.63	136.06	170.38	68.15	23.07
5	8.50	10.00	1.50	Granular	17.55	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	113.66	126.83	5.65	28.15	168.57	231.04	92.41	33.32
6	10.00	11.50	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	140.70	154.58	5.65	37.63	289.40	389.50	155.80	46.23
7	11.50	13.00	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	168.45	182.33	5.65	45.05	338.24	483.38	193.35	61.22
8	13.00	14.50	1.50	Granular	8.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	188.85	195.37	5.65	52.37	404.36	601.88	240.75	78.26
9	14.50	16.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	203.01	210.66	5.65	56.30	436.88	690.71	276.28	96.40
10	16.00	17.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	218.30	225.95	5.65	62.71	528.42	844.94	337.98	116.34
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	225.95	225.95	5.65	64.90	528.42	909.85	363.94	136.88
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	225.95	225.95	5.65	67.14	589.03	1037.60	415.04	158.06
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	225.95	225.95	5.65	67.14	589.03	1104.74	441.90	179.23
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	225.95	225.95	5.65	67.14	589.03	1171.88	468.75	200.41
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	225.95	225.95	5.65	67.14	589.03	1239.02	495.61	221.58
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	225.95	225.95	5.65	67.14	589.03	1306.16	522.46	242.76
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	225.95	225.95	5.65	67.14	589.03	1373.30	549.32	263.93
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	225.95	225.95	5.65	67.14	589.03	1440.44	576.18	285.11
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	225.95	225.95	1.88	22.38	589.03	1462.82	585.13	292.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.573	13.96	3.49	56.12	25.86	33.51	8.38	134.70	62.07
2	22.50	20	2.96E+07	1.02E-01	2.82E+03	4.03	1.36	1.98	1.82	7.97	7.35	0.139	0.558	14.34	3.58	57.13	26.33	34.41	8.60	137.10	63.20
3	24.00	21	2.96E+07	1.02E-01	2.96E+03	3.99	1.38	1.97	1.82	7.88	7.27	0.135	0.540	14.80	3.70	58.36	26.91	35.53	8.88	140.07	64.59
4	25.50	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.39	1.97	1.82	7.81	7.21	0.132	0.526	15.20	3.80	59.40	27.40	36.49	9.12	142.56	65.77
5	27.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.53	3.88	60.26	27.81	37.28	9.32	144.62	66.74
6	28.50	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.506	15.81	3.95	60.98	28.15	37.95	9.49	146.36	67.56
7	30.00	24	2.96E+07	1.02E-01	3.36E+03	3.90	1.41	1.97	1.82	7.68	7.09	0.125	0.499	16.04	4.01	61.57	28.43	38.50	9.63	147.77	68.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-03)	-
Chainage	0+344	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	199.19	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-03)	1.00	22.00	19.50	16.50	303.99	136.14	10.42	2.60
BH-(-03)	1.00	23.50	21.00	18.00	323.72	151.60	10.74	2.69
BH-(-03)	1.00	25.00	22.50	19.50	343.45	167.06	11.12	2.78
BH-(-03)	1.00	26.50	24.00	21.00	363.18	182.52	11.45	2.86
BH-(-03)	1.00	28.00	25.50	22.50	382.91	197.98	11.72	2.93
BH-(-03)	1.00	29.50	27.00	24.00	402.64	213.44	11.95	2.99
BH-(-03)	1.00	30.00	27.50	24.50	409.22	218.60	12.14	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	11.96	23.93	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.55	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	37.09	50.25	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.55	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	63.41	76.58	4.71	11.52	48.55	60.07	24.03	10.92
4	7.00	8.50	1.50	Granular	17.55	0.02	22	-	4.00	7.59	1.00	-	7.75	8.50	89.74	102.90	4.71	16.30	64.30	92.11	36.84	17.13
5	8.50	10.00	1.50	Granular	18.50	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	116.78	130.65	4.71	24.10	119.34	171.24	68.50	25.53
6	10.00	11.50	1.50	Granular	18.50	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	144.53	158.40	4.71	29.82	143.13	224.87	89.95	35.53
7	11.50	13.00	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	172.28	186.15	4.71	38.39	237.55	357.68	143.07	47.93
8	13.00	14.50	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	192.67	199.19	4.71	42.94	248.15	411.22	164.49	61.60
9	14.50	16.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	199.19	199.19	4.71	46.04	285.72	494.82	197.93	76.14
10	16.00	17.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	199.19	199.19	4.71	46.04	285.72	540.86	216.34	90.68
11	17.50	19.00	1.50	Granular	9.69	0.06	29	-	17.60	20.13	1.00	-	18.25	19.00	199.19	199.19	4.71	47.68	322.75	625.57	250.23	105.68
12	19.00	20.50	1.50	Granular	9.69	0.06	29	-	17.60	20.13	1.00	-	19.75	20.50	199.19	199.19	4.71	47.68	322.75	673.25	269.30	120.68
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	199.19	199.19	4.71	49.33	360.16	759.98	303.99	136.14
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	199.19	199.19	4.71	49.33	360.16	809.31	323.72	151.60
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	199.19	199.19	4.71	49.33	360.16	858.63	343.45	167.06
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	199.19	199.19	4.71	49.33	360.16	907.96	363.18	182.52
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	199.19	199.19	4.71	49.33	360.16	957.28	382.91	197.98
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	199.19	199.19	4.71	49.33	360.16	1006.61	402.64	213.44
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	199.19	199.19	1.57	16.44	360.16	1023.05	409.22	218.60

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.57E+03	3.55	1.55	1.96	1.82	6.95	6.44	0.192	0.768	10.42	2.60	36.21	16.79	25.01	6.25	86.91	40.29
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.74	2.69	36.95	17.14	25.78	6.44	88.68	41.13
3	24.00	20	2.96E+07	4.91E-02	2.85E+03	3.48	1.58	1.96	1.81	6.80	6.31	0.180	0.719	11.12	2.78	37.82	17.55	26.70	6.67	90.78	42.12
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.74	6.25	0.175	0.699	11.45	2.86	38.56	17.90	27.48	6.87	92.54	42.96
5	27.00	22	2.96E+07	4.91E-02	3.09E+03	3.42	1.61	1.95	1.81	6.68	6.21	0.171	0.683	11.72	2.93	39.16	18.18	28.12	7.03	93.99	43.64
6	28.50	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.95	2.99	39.68	18.43	28.68	7.17	95.22	44.23
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.62	1.95	1.81	6.61	6.14	0.165	0.659	12.14	3.03	40.09	18.63	29.13	7.28	96.22	44.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-03)	-
Chainage	0+344	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	228.27	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-03)	1.20	22.00	19.50	16.50	443.26	178.53	13.54	3.38
BH-(-03)	1.20	23.50	21.00	18.00	470.39	199.90	13.95	3.49
BH-(-03)	1.20	25.00	22.50	19.50	497.53	221.27	14.45	3.61
BH-(-03)	1.20	26.50	24.00	21.00	524.66	242.63	14.87	3.72
BH-(-03)	1.20	28.00	25.50	22.50	551.79	264.00	15.22	3.81
BH-(-03)	1.20	29.50	27.00	24.00	578.92	285.37	15.52	3.88
BH-(-03)	1.20	30.00	27.50	24.50	587.97	292.49	15.77	3.94

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	11.96	23.93	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.55	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	37.09	50.25	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.55	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	63.41	76.58	5.65	13.82	70.72	84.53	33.81	14.95
4	7.00	8.50	1.50	Granular	17.55	0.02	22	-	4.00	7.59	1.00	-	7.75	8.50	89.74	102.90	5.65	19.55	93.38	126.76	50.70	22.80
5	8.50	10.00	1.50	Granular	18.50	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	116.78	130.65	5.65	28.92	173.94	236.23	94.49	33.27
6	10.00	11.50	1.50	Granular	18.50	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	144.53	158.40	5.65	35.79	208.21	306.29	122.52	45.67
7	11.50	13.00	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	172.28	186.15	5.65	46.07	344.97	489.12	195.65	60.95
8	13.00	14.50	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	192.67	199.19	5.65	51.53	358.70	554.38	221.75	77.75
9	14.50	16.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	206.46	213.73	5.65	57.26	442.57	695.51	278.20	96.16
10	16.00	17.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	221.00	228.27	5.65	61.29	471.97	786.20	314.48	115.69
11	17.50	19.00	1.50	Granular	9.69	0.06	29	-	17.60	20.13	1.00	-	18.25	19.00	228.27	228.27	5.65	65.57	533.13	912.93	365.17	136.43
12	19.00	20.50	1.50	Granular	9.69	0.06	29	-	17.60	20.13	1.00	-	19.75	20.50	228.27	228.27	5.65	65.57	533.13	978.50	391.40	157.16
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	228.27	228.27	5.65	67.83	594.95	1108.15	443.26	178.53
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	228.27	228.27	5.65	67.83	594.95	1175.99	470.39	199.90
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	228.27	228.27	5.65	67.83	594.95	1243.82	497.53	221.27
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	228.27	228.27	5.65	67.83	594.95	1311.65	524.66	242.63
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	228.27	228.27	5.65	67.83	594.95	1379.48	551.79	264.00
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	228.27	228.27	5.65	67.83	594.95	1447.31	578.92	285.37
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	228.27	228.27	1.88	22.61	594.95	1469.92	587.97	292.49

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.57E+03	4.11	1.34	1.98	1.82	8.12	7.48	0.148	0.591	13.54	3.38	54.98	25.32	32.49	8.12	131.94	60.77
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.573	13.95	3.49	56.10	25.85	33.49	8.37	134.64	62.04
3	24.00	20	2.96E+07	1.02E-01	2.85E+03	4.02	1.37	1.97	1.82	7.95	7.33	0.138	0.554	14.45	3.61	57.42	26.47	34.68	8.67	137.82	63.53
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.87	3.72	58.54	27.00	35.69	8.92	140.49	64.79
5	27.00	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.39	1.97	1.82	7.81	7.21	0.131	0.526	15.22	3.81	59.46	27.43	36.54	9.13	142.69	65.83
6	28.50	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.52	3.88	60.24	27.80	37.26	9.31	144.57	66.71
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.507	15.77	3.94	60.87	28.09	37.85	9.46	146.09	67.43

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-05)	-
Chainage	0+094	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	202.64	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	13.26	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-05)	1.00	22.00	19.50	15.00	306.58	136.25	10.87	2.72
BH-(-05)	1.00	23.50	21.00	16.50	326.66	151.95	11.10	2.78
BH-(-05)	1.00	25.00	22.50	18.00	346.73	167.65	11.51	2.88
BH-(-05)	1.00	26.50	24.00	19.50	366.80	183.35	11.86	2.97
BH-(-05)	1.00	28.00	25.50	21.00	386.87	199.04	12.15	3.04
BH-(-05)	1.00	29.50	27.00	22.50	406.94	214.74	12.40	3.10
BH-(-05)	1.00	30.00	27.50	23.00	413.63	219.98	12.61	3.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.05	21	-	2.00	6.49	1.00	-	3.25	4.00	11.96	23.93	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	15.95	0.05	21	-	2.00	6.49	1.00	-	4.75	5.50	35.89	47.85	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.50	0.05	21	-	2.00	6.49	1.00	-	6.25	7.00	60.98	74.10	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.50	0.05	21	-	2.00	6.49	1.00	-	7.75	8.50	87.23	100.35	4.71	15.12	52.70	67.82	27.13	13.58
5	8.50	10.00	1.50	Granular	19.50	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	114.98	129.60	4.71	24.67	143.91	183.70	73.48	22.14
6	10.00	11.50	1.50	Granular	19.50	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	144.23	158.85	4.71	30.95	174.32	245.07	98.03	32.45
7	11.50	13.00	1.50	Granular	19.50	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	173.48	188.10	4.71	40.09	276.22	387.06	154.82	45.33
8	13.00	14.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	195.37	202.64	4.71	45.15	290.57	446.56	178.62	59.62
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	202.64	202.64	4.71	48.51	328.22	532.72	213.09	74.85
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	202.64	202.64	4.71	48.51	328.22	581.23	232.49	90.08
11	17.50	19.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	202.64	202.64	4.71	48.51	328.22	629.73	251.89	105.32
12	19.00	20.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	202.64	202.64	4.71	48.51	328.57	678.59	271.44	120.55
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	202.64	202.64	4.71	50.18	366.26	766.46	306.58	136.25
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	202.64	202.64	4.71	50.18	366.26	816.64	326.66	151.95
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	202.64	202.64	4.71	50.18	366.26	866.82	346.73	167.65
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	202.64	202.64	4.71	50.18	366.26	917.00	366.80	183.35
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	202.64	202.64	4.71	50.18	366.26	967.18	386.87	199.04
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	202.64	202.64	4.71	50.18	366.26	1017.36	406.94	214.74
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	202.64	202.64	1.57	16.73	366.26	1034.08	413.63	219.98

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.97	1.93	1.80	6.85	6.42	0.184	0.736	10.87	2.72	37.25	17.44	26.09	6.52	89.39	41.86
2	22.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.98	1.93	1.80	6.81	6.38	0.180	0.721	11.10	2.78	37.77	17.69	26.64	6.66	90.65	42.47
3	24.00	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.174	0.695	11.51	2.88	38.70	18.14	27.63	6.91	92.88	43.53
4	25.50	21	2.96E+07	4.91E-02	2.93E+03	3.46	2.02	1.92	1.80	6.66	6.24	0.169	0.674	11.86	2.97	39.48	18.51	28.47	7.12	94.76	44.43
5	27.00	21	2.96E+07	4.91E-02	3.04E+03	3.43	2.04	1.92	1.80	6.60	6.19	0.165	0.658	12.15	3.04	40.13	18.82	29.17	7.29	96.31	45.17
6	28.50	22	2.96E+07	4.91E-02	3.14E+03	3.41	2.05	1.92	1.80	6.56	6.15	0.161	0.645	12.40	3.10	40.67	19.08	29.77	7.44	97.62	45.79
7	30.00	23	2.96E+07	4.91E-02	3.22E+03	3.40	2.06	1.92	1.80	6.52	6.12	0.159	0.635	12.61	3.15	41.12	19.29	30.26	7.56	98.69	46.30

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-05)	-
Chainage	0+094	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	231.72	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	13.26	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-05)	1.20	22.00	19.50	15.00	447.07	178.74	14.14	3.53
BH-(-05)	1.20	23.50	21.00	16.50	474.61	200.39	14.44	3.61
BH-(-05)	1.20	25.00	22.50	18.00	502.16	222.05	14.98	3.74
BH-(-05)	1.20	26.50	24.00	19.50	529.70	243.70	15.44	3.86
BH-(-05)	1.20	28.00	25.50	21.00	557.24	265.36	15.82	3.95
BH-(-05)	1.20	29.50	27.00	22.50	584.78	287.01	16.14	4.04
BH-(-05)	1.20	30.00	27.50	23.00	593.97	294.23	16.41	4.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.05	21	-	2.00	6.49	1.00	-	3.25	4.00	11.96	23.93	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	15.95	0.05	21	-	2.00	6.49	1.00	-	4.75	5.50	35.89	47.85	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.50	0.05	21	-	2.00	6.49	1.00	-	6.25	7.00	60.98	74.10	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.50	0.05	21	-	2.00	6.49	1.00	-	7.75	8.50	87.23	100.35	5.65	18.14	76.28	94.43	37.77	18.54
5	8.50	10.00	1.50	Granular	19.50	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	114.98	129.60	5.65	29.61	209.86	257.61	103.05	29.20
6	10.00	11.50	1.50	Granular	19.50	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	144.23	158.85	5.65	37.14	253.66	338.55	135.42	41.98
7	11.50	13.00	1.50	Granular	19.50	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	173.48	188.10	5.65	48.11	401.22	534.23	213.69	57.83
8	13.00	14.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	195.37	202.64	5.65	54.18	420.14	607.34	242.93	75.37
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	209.91	217.18	5.65	60.30	507.79	755.28	302.11	94.63
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	224.45	231.72	5.65	64.47	541.01	852.97	341.19	115.06
11	17.50	19.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	231.72	231.72	5.65	66.56	541.01	919.53	367.81	136.07
12	19.00	20.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	231.72	231.72	5.65	66.56	541.61	986.69	394.68	157.08
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	231.72	231.72	5.65	68.86	603.74	1117.68	447.07	178.74
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	231.72	231.72	5.65	68.86	603.74	1186.54	474.61	200.39
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	231.72	231.72	5.65	68.86	603.74	1255.39	502.16	222.05
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	231.72	231.72	5.65	68.86	603.74	1324.25	529.70	243.70
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	231.72	231.72	5.65	68.86	603.74	1393.11	557.24	265.36
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	231.72	231.72	5.65	68.86	603.74	1461.96	584.78	287.01
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	231.72	231.72	1.88	22.95	603.74	1484.91	593.97	294.23

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.12	1.70	1.95	1.81	8.01	7.45	0.141	0.566	14.14	3.53	56.59	26.34	33.93	8.48	135.82	63.22
2	22.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.71	1.94	1.81	7.95	7.40	0.139	0.554	14.44	3.61	57.39	26.72	34.65	8.66	137.75	64.14
3	24.00	20	2.96E+07	1.02E-01	2.79E+03	4.04	1.73	1.94	1.81	7.85	7.32	0.134	0.534	14.98	3.74	58.81	27.40	35.95	8.99	141.15	65.76
4	25.50	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.75	1.94	1.81	7.78	7.25	0.130	0.518	15.44	3.86	60.01	27.97	37.05	9.26	144.02	67.12
5	27.00	21	2.96E+07	1.02E-01	3.04E+03	3.97	1.76	1.94	1.81	7.71	7.19	0.126	0.506	15.82	3.95	60.99	28.43	37.96	9.49	146.37	68.24
6	28.50	22	2.96E+07	1.02E-01	3.14E+03	3.95	1.77	1.94	1.81	7.66	7.14	0.124	0.496	16.14	4.04	61.82	28.83	38.74	9.69	148.38	69.19
7	30.00	23	2.96E+07	1.02E-01	3.22E+03	3.93	1.78	1.94	1.81	7.62	7.11	0.122	0.488	16.41	4.10	62.50	29.15	39.38	9.85	150.01	69.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-06)	-
Chainage	0-015	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	198.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-06)	1.00	22.00	19.50	16.50	301.35	134.73	10.59	2.65
BH-(-06)	1.00	23.50	21.00	18.00	320.99	150.13	10.78	2.70
BH-(-06)	1.00	25.00	22.50	19.50	340.63	165.53	11.17	2.79
BH-(-06)	1.00	26.50	24.00	21.00	360.27	180.93	11.49	2.87
BH-(-06)	1.00	28.00	25.50	22.50	379.91	196.33	11.77	2.94
BH-(-06)	1.00	29.50	27.00	24.00	399.55	211.72	12.00	3.00
BH-(-06)	1.00	30.00	27.50	24.50	406.10	216.86	12.19	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	6.25	7.00	63.75	76.50	4.71	12.10	56.38	68.49	27.39	11.09
4	7.00	8.50	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	7.75	8.50	89.25	102.00	4.71	16.94	73.84	102.89	41.15	17.48
5	8.50	10.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	114.75	127.50	4.71	23.68	116.04	168.77	67.51	25.76
6	10.00	11.50	1.50	Granular	18.50	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	141.38	155.25	4.71	29.17	140.43	222.33	88.93	35.58
7	11.50	13.00	1.50	Granular	18.50	0.08	26	-	11.90	13.19	1.00	-	12.25	13.00	169.13	183.00	4.71	36.30	198.96	317.16	126.86	47.39
8	13.00	14.50	1.50	Granular	10.19	0.08	26	-	11.90	13.19	1.00	-	13.75	14.50	190.65	198.29	4.71	40.91	210.97	370.08	148.03	60.49
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	198.29	198.29	4.71	45.83	284.77	489.71	195.88	74.98
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	198.29	198.29	4.71	45.83	284.77	535.53	214.21	89.46
11	17.50	19.00	1.50	Granular	10.19	0.01	29	-	17.60	20.13	1.00	-	18.25	19.00	198.29	198.29	4.71	47.47	321.67	619.90	247.96	104.40
12	19.00	20.50	1.50	Granular	10.19	0.01	29	-	17.60	20.13	1.00	-	19.75	20.50	198.29	198.29	4.71	47.47	321.67	667.36	266.95	119.34
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	198.29	198.29	4.71	49.10	358.56	753.37	301.35	134.73
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	198.29	198.29	4.71	49.10	358.56	802.47	320.99	150.13
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	198.29	198.29	4.71	49.10	358.56	851.57	340.63	165.53
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	198.29	198.29	4.71	49.10	358.56	900.67	360.27	180.93
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	198.29	198.29	4.71	49.10	358.56	949.78	379.91	196.33
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	198.29	198.29	4.71	49.10	358.56	998.88	399.55	211.72
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	198.29	198.29	1.57	16.37	358.56	1015.24	406.10	216.86

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.56	1.96	1.82	6.91	6.41	0.189	0.755	10.59	2.65	36.61	16.98	25.42	6.36	87.87	40.74
2	22.50	19	2.96E+07	4.91E-02	2.72E+03	3.51	1.57	1.96	1.81	6.87	6.37	0.186	0.742	10.78	2.70	37.04	17.18	25.87	6.47	88.90	41.23
3	24.00	20	2.96E+07	4.91E-02	2.87E+03	3.47	1.58	1.95	1.81	6.79	6.30	0.179	0.716	11.17	2.79	37.92	17.60	26.80	6.70	91.01	42.23
4	25.50	21	2.96E+07	4.91E-02	3.00E+03	3.44	1.60	1.95	1.81	6.73	6.25	0.174	0.696	11.49	2.87	38.66	17.95	27.59	6.90	92.78	43.07
5	27.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.67	6.20	0.170	0.680	11.77	2.94	39.27	18.24	28.24	7.06	94.25	43.77
6	28.50	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.667	12.00	3.00	39.79	18.48	28.80	7.20	95.49	44.36
7	30.00	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.656	12.19	3.05	40.21	18.68	29.27	7.32	96.51	44.84

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-06)	-
Chainage	0-015	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	228.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-06)	1.20	22.00	19.50	16.50	442.15	177.33	13.76	3.44
BH-(-06)	1.20	23.50	21.00	18.00	469.35	198.74	14.00	3.50
BH-(-06)	1.20	25.00	22.50	19.50	496.56	220.16	14.51	3.63
BH-(-06)	1.20	26.50	24.00	21.00	523.76	241.58	14.93	3.73
BH-(-06)	1.20	28.00	25.50	22.50	550.97	263.00	15.29	3.82
BH-(-06)	1.20	29.50	27.00	24.00	578.17	284.41	15.59	3.90
BH-(-06)	1.20	30.00	27.50	24.50	587.24	291.55	15.84	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	6.25	7.00	63.75	76.50	5.65	14.52	82.35	96.87	38.75	15.15
4	7.00	8.50	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	7.75	8.50	89.25	102.00	5.65	20.33	107.49	142.34	56.94	23.22
5	8.50	10.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	114.75	127.50	5.65	28.42	169.03	232.30	92.92	33.55
6	10.00	11.50	1.50	Granular	18.50	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	141.38	155.25	5.65	35.01	204.32	302.60	121.04	45.73
7	11.50	13.00	1.50	Granular	18.50	0.08	26	-	11.90	13.19	1.00	-	12.25	13.00	169.13	183.00	5.65	43.56	289.01	430.84	172.34	60.30
8	13.00	14.50	1.50	Granular	10.19	0.08	26	-	11.90	13.19	1.00	-	13.75	14.50	190.65	198.29	5.65	49.10	305.17	496.10	198.44	76.42
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	205.94	213.58	5.65	57.11	442.80	690.85	276.34	94.79
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	221.23	228.87	5.65	61.36	473.72	783.12	313.25	114.34
11	17.50	19.00	1.50	Granular	10.19	0.01	29	-	17.60	20.13	1.00	-	18.25	19.00	228.87	228.87	5.65	65.74	535.10	910.24	364.10	135.12
12	19.00	20.50	1.50	Granular	10.19	0.01	29	-	17.60	20.13	1.00	-	19.75	20.50	228.87	228.87	5.65	65.74	535.10	975.99	390.39	155.91
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	228.87	228.87	5.65	68.01	596.48	1105.38	442.15	177.33
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	228.87	228.87	5.65	68.01	596.48	1173.39	469.35	198.74
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	228.87	228.87	5.65	68.01	596.48	1241.40	496.56	220.16
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	228.87	228.87	5.65	68.01	596.48	1309.41	523.76	241.58
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	228.87	228.87	5.65	68.01	596.48	1377.41	550.97	263.00
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	228.87	228.87	5.65	68.01	596.48	1445.42	578.17	284.41
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	228.87	228.87	1.88	22.67	596.48	1468.09	587.24	291.55

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.35	1.98	1.82	8.08	7.44	0.145	0.581	13.76	3.44	55.58	25.61	33.02	8.26	133.40	61.45
2	22.50	19	2.96E+07	1.02E-01	2.72E+03	4.06	1.35	1.98	1.82	8.03	7.40	0.143	0.571	14.00	3.50	56.24	25.91	33.61	8.40	134.97	62.19
3	24.00	20	2.96E+07	1.02E-01	2.87E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.552	14.51	3.63	57.57	26.54	34.81	8.70	138.17	63.70
4	25.50	21	2.96E+07	1.02E-01	3.00E+03	3.98	1.38	1.97	1.82	7.86	7.25	0.134	0.536	14.93	3.73	58.69	27.07	35.84	8.96	140.87	64.97
5	27.00	22	2.96E+07	1.02E-01	3.11E+03	3.95	1.39	1.97	1.82	7.80	7.20	0.131	0.523	15.29	3.82	59.62	27.51	36.69	9.17	143.09	66.01
6	28.50	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.59	3.90	60.41	27.88	37.42	9.35	144.98	66.91
7	30.00	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.505	15.84	3.96	61.05	28.18	38.02	9.50	146.53	67.64

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-08)	-
Chainage	0-174	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	193.79	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.65	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-08)	1.00	22.00	19.50	16.50	298.91	135.26	10.89	2.72
BH-(-08)	1.00	23.50	21.00	18.00	318.10	150.34	11.17	2.79
BH-(-08)	1.00	25.00	22.50	19.50	337.30	165.43	11.52	2.88
BH-(-08)	1.00	26.50	24.00	21.00	356.49	180.51	11.82	2.95
BH-(-08)	1.00	28.00	25.50	22.50	375.69	195.60	12.06	3.02
BH-(-08)	1.00	29.50	27.00	24.00	394.88	210.69	12.27	3.07
BH-(-08)	1.00	30.00	27.50	24.50	401.28	215.71	12.44	3.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	4.71	13.16	72.31	85.46	34.18	11.38
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	4.71	18.42	94.17	125.75	50.30	18.19
5	8.50	10.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	114.75	127.50	4.71	23.68	116.04	171.29	68.52	26.47
6	10.00	11.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	140.25	153.00	4.71	28.94	137.91	222.10	88.84	36.22
7	11.50	13.00	1.50	Granular	18.50	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	166.88	180.75	4.71	37.19	230.95	352.33	140.93	48.28
8	13.00	14.50	1.50	Granular	8.69	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	187.27	193.79	4.71	41.74	241.55	404.67	161.87	61.62
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	193.79	193.79	4.71	46.39	314.53	524.03	209.61	76.26
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	193.79	193.79	4.71	46.39	314.53	570.42	228.17	90.89
11	17.50	19.00	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	193.79	193.79	4.71	46.39	314.53	616.81	246.72	105.53
12	19.00	20.50	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	193.79	193.79	4.71	46.39	314.53	663.20	265.28	120.17
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	193.79	193.79	4.71	47.99	350.61	747.27	298.91	135.26
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	193.79	193.79	4.71	47.99	350.61	795.25	318.10	150.34
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	193.79	193.79	4.71	47.99	350.61	843.24	337.30	165.43
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	193.79	193.79	4.71	47.99	350.61	891.23	356.49	180.51
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	193.79	193.79	4.71	47.99	350.61	939.22	375.69	195.60
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	193.79	193.79	4.71	47.99	350.61	987.21	394.88	210.69
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	193.79	193.79	1.57	16.00	350.61	1003.20	401.28	215.71

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.76E+03	3.50	1.57	1.96	1.81	6.85	6.35	0.184	0.735	10.89	2.72	37.29	17.30	26.14	6.53	89.50	41.52
2	22.50	20	2.96E+07	4.91E-02	2.87E+03	3.47	1.58	1.95	1.81	6.79	6.30	0.179	0.716	11.17	2.79	37.93	17.60	26.80	6.70	91.02	42.24
3	24.00	21	2.96E+07	4.91E-02	3.01E+03	3.44	1.60	1.95	1.81	6.72	6.24	0.174	0.695	11.52	2.88	38.71	17.97	27.64	6.91	92.91	43.13
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.677	11.82	2.95	39.38	18.29	28.36	7.09	94.51	43.89
5	27.00	23	2.96E+07	4.91E-02	3.24E+03	3.39	1.62	1.95	1.81	6.62	6.15	0.166	0.663	12.06	3.02	39.92	18.55	28.95	7.24	95.82	44.51
6	28.50	23	2.96E+07	4.91E-02	3.32E+03	3.37	1.63	1.95	1.81	6.58	6.12	0.163	0.652	12.27	3.07	40.39	18.77	29.46	7.36	96.93	45.04
7	30.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	1.64	1.95	1.81	6.55	6.09	0.161	0.643	12.44	3.11	40.76	18.94	29.87	7.47	97.83	45.46

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-08)	-
Chainage	0-174	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	224.37	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.65	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-08)	1.20	22.00	19.50	16.50	438.58	178.04	14.15	3.54
BH-(-08)	1.20	23.50	21.00	18.00	465.25	199.08	14.51	3.63
BH-(-08)	1.20	25.00	22.50	19.50	491.92	220.12	14.96	3.74
BH-(-08)	1.20	26.50	24.00	21.00	518.59	241.17	15.35	3.84
BH-(-08)	1.20	28.00	25.50	22.50	545.26	262.21	15.67	3.92
BH-(-08)	1.20	29.50	27.00	24.00	571.92	283.25	15.94	3.99
BH-(-08)	1.20	30.00	27.50	24.50	580.81	290.27	16.17	4.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	5.65	15.79	106.05	121.84	48.73	15.50
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	5.65	22.10	137.54	175.43	70.17	24.07
5	8.50	10.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	114.75	127.50	5.65	28.42	169.03	235.33	94.13	34.40
6	10.00	11.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	140.25	153.00	5.65	34.73	200.52	301.55	120.62	46.50
7	11.50	13.00	1.50	Granular	18.50	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	166.88	180.75	5.65	44.63	335.47	481.13	192.45	61.37
8	13.00	14.50	1.50	Granular	8.69	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	187.27	193.79	5.65	50.08	349.20	544.94	217.98	77.77
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	201.44	209.08	5.65	57.86	489.89	743.49	297.40	96.34
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	216.73	224.37	5.65	62.25	524.82	840.68	336.27	116.15
11	17.50	19.00	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	224.37	224.37	5.65	64.45	524.82	905.13	362.05	136.57
12	19.00	20.50	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	224.37	224.37	5.65	64.45	524.82	969.58	387.83	156.99
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	224.37	224.37	5.65	66.67	585.02	1096.45	438.58	178.04
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	224.37	224.37	5.65	66.67	585.02	1163.12	465.25	199.08
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	224.37	224.37	5.65	66.67	585.02	1229.79	491.92	220.12
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	224.37	224.37	5.65	66.67	585.02	1296.47	518.59	241.17
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	224.37	224.37	5.65	66.67	585.02	1363.14	545.26	262.21
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	224.37	224.37	5.65	66.67	585.02	1429.81	571.92	283.25
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	224.37	224.37	1.88	22.22	585.02	1452.04	580.81	290.27

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.76E+03	4.05	1.36	1.98	1.82	8.00	7.38	0.141	0.566	14.15	3.54	56.62	26.09	33.95	8.49	135.88	62.62
2	22.50	20	2.96E+07	1.02E-01	2.87E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.551	14.51	3.63	57.58	26.55	34.82	8.70	138.19	63.71
3	24.00	21	2.96E+07	1.02E-01	3.01E+03	3.98	1.38	1.97	1.82	7.86	7.25	0.134	0.535	14.96	3.74	58.78	27.11	35.91	8.98	141.06	65.06
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.521	15.35	3.84	59.78	27.58	36.84	9.21	143.48	66.20
5	27.00	23	2.96E+07	1.02E-01	3.24E+03	3.92	1.40	1.97	1.82	7.74	7.14	0.128	0.511	15.67	3.92	60.61	27.97	37.61	9.40	145.47	67.14
6	28.50	23	2.96E+07	1.02E-01	3.32E+03	3.90	1.41	1.97	1.82	7.69	7.10	0.125	0.502	15.94	3.99	61.32	28.31	38.26	9.57	147.16	67.93
7	30.00	24	2.96E+07	1.02E-01	3.40E+03	3.89	1.42	1.97	1.82	7.66	7.07	0.124	0.495	16.17	4.04	61.89	28.57	38.80	9.70	148.52	68.58

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-09)	-
Chainage	0-224	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	193.94	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-09)	1.00	22.00	19.50	16.50	293.86	131.65	10.36	2.59
BH-(-09)	1.00	23.50	21.00	18.00	313.07	146.74	10.75	2.69
BH-(-09)	1.00	25.00	22.50	19.50	332.28	161.84	11.14	2.79
BH-(-09)	1.00	26.50	24.00	21.00	351.49	176.94	11.48	2.87
BH-(-09)	1.00	28.00	25.50	22.50	370.70	192.03	11.76	2.94
BH-(-09)	1.00	29.50	27.00	24.00	389.91	207.13	12.00	3.00
BH-(-09)	1.00	30.00	27.50	24.50	396.31	212.16	12.20	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	11.96	23.93	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	35.89	47.85	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.55	0.04	22	-	4.00	7.59	1.00	-	6.25	7.00	61.01	74.18	4.71	11.08	47.12	58.20	23.28	10.80
4	7.00	8.50	1.50	Granular	17.55	0.04	22	-	4.00	7.59	1.00	-	7.75	8.50	87.34	100.50	4.71	15.86	62.86	89.80	35.92	16.89
5	8.50	10.00	1.50	Granular	17.55	0.03	24	-	8.00	9.78	1.00	-	9.25	10.00	113.66	126.83	4.71	22.52	103.32	152.78	61.11	24.84
6	10.00	11.50	1.50	Granular	17.55	0.03	24	-	8.00	9.78	1.00	-	10.75	11.50	139.99	153.15	4.71	27.73	123.62	200.81	80.32	34.26
7	11.50	13.00	1.50	Granular	18.50	0.02	26	-	11.90	13.19	1.00	-	12.25	13.00	167.03	180.90	4.71	35.85	196.78	309.81	123.93	45.94
8	13.00	14.50	1.50	Granular	8.69	0.02	26	-	11.90	13.19	1.00	-	13.75	14.50	187.42	193.94	4.71	40.22	205.74	359.00	143.60	58.86
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	193.94	193.94	4.71	44.82	278.66	476.74	190.69	73.06
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	193.94	193.94	4.71	44.82	278.66	521.56	208.62	87.26
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	193.94	193.94	4.71	46.42	314.76	604.09	241.64	101.90
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	193.94	193.94	4.71	46.42	314.76	650.52	260.21	116.55
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	193.94	193.94	4.71	48.03	350.87	734.65	293.86	131.65
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	193.94	193.94	4.71	48.03	350.87	782.67	313.07	146.74
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	193.94	193.94	4.71	48.03	350.87	830.70	332.28	161.84
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	193.94	193.94	4.71	48.03	350.87	878.72	351.49	176.94
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	193.94	193.94	4.71	48.03	350.87	926.75	370.70	192.03
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	193.94	193.94	4.71	48.03	350.87	974.77	389.91	207.13
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	193.94	193.94	1.57	16.01	350.87	990.78	396.31	212.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.08	16.72	24.87	6.22	86.59	40.14
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.744	10.75	2.69	36.97	17.15	25.80	6.45	88.74	41.15
3	24.00	20	2.96E+07	4.91E-02	2.86E+03	3.48	1.58	1.96	1.81	6.80	6.31	0.179	0.718	11.14	2.79	37.87	17.57	26.75	6.69	90.89	42.18
4	25.50	21	2.96E+07	4.91E-02	2.99E+03	3.44	1.60	1.95	1.81	6.73	6.25	0.174	0.697	11.48	2.87	38.63	17.93	27.55	6.89	92.71	43.04
5	27.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.68	6.20	0.170	0.680	11.76	2.94	39.25	18.23	28.22	7.06	94.21	43.75
6	28.50	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.667	12.00	3.00	39.79	18.48	28.80	7.20	95.49	44.35
7	30.00	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.63	1.95	1.81	6.59	6.13	0.164	0.656	12.20	3.05	40.22	18.69	29.28	7.32	96.54	44.85

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-09)	-
Chainage	0-224	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	224.52	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-09)	1.20	22.00	19.50	16.50	432.43	173.62	13.46	3.37
BH-(-09)	1.20	23.50	21.00	18.00	459.11	194.68	13.97	3.49
BH-(-09)	1.20	25.00	22.50	19.50	485.80	215.73	14.48	3.62
BH-(-09)	1.20	26.50	24.00	21.00	512.49	236.79	14.91	3.73
BH-(-09)	1.20	28.00	25.50	22.50	539.17	257.84	15.28	3.82
BH-(-09)	1.20	29.50	27.00	24.00	565.86	278.90	15.59	3.90
BH-(-09)	1.20	30.00	27.50	24.50	574.76	285.92	15.85	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	11.96	23.93	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	35.89	47.85	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.55	0.04	22	-	4.00	7.59	1.00	-	6.25	7.00	61.01	74.18	5.65	13.30	68.65	81.94	32.78	14.81
4	7.00	8.50	1.50	Granular	17.55	0.04	22	-	4.00	7.59	1.00	-	7.75	8.50	87.34	100.50	5.65	19.03	91.32	123.64	49.46	22.51
5	8.50	10.00	1.50	Granular	17.55	0.03	24	-	8.00	9.78	1.00	-	9.25	10.00	113.66	126.83	5.65	27.02	150.38	209.72	83.89	32.45
6	10.00	11.50	1.50	Granular	17.55	0.03	24	-	8.00	9.78	1.00	-	10.75	11.50	139.99	153.15	5.65	33.28	179.60	272.23	108.89	44.14
7	11.50	13.00	1.50	Granular	18.50	0.02	26	-	11.90	13.19	1.00	-	12.25	13.00	167.03	180.90	5.65	43.01	285.86	421.50	168.60	58.56
8	13.00	14.50	1.50	Granular	8.69	0.02	26	-	11.90	13.19	1.00	-	13.75	14.50	187.42	193.94	5.65	48.27	297.44	481.35	192.54	74.45
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	201.59	209.23	5.65	55.91	434.00	673.82	269.53	92.48
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	216.88	224.52	5.65	60.15	464.92	764.89	305.95	111.70
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	224.52	224.52	5.65	64.49	525.16	889.62	355.85	132.13
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	224.52	224.52	5.65	64.49	525.16	954.11	381.64	152.57
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	224.52	224.52	5.65	66.72	585.40	1081.07	432.43	173.62
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	224.52	224.52	5.65	66.72	585.40	1147.78	459.11	194.68
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	224.52	224.52	5.65	66.72	585.40	1214.50	485.80	215.73
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	224.52	224.52	5.65	66.72	585.40	1281.22	512.49	236.79
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	224.52	224.52	5.65	66.72	585.40	1347.93	539.17	257.84
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	224.52	224.52	5.65	66.72	585.40	1414.65	565.86	278.90
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	224.52	224.52	1.88	22.24	585.40	1436.89	574.76	285.92

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.37	54.78	25.23	32.31	8.08	131.46	60.55
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.573	13.97	3.49	56.13	25.86	33.52	8.38	134.72	62.08
3	24.00	20	2.96E+07	1.02E-01	2.86E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.553	14.48	3.62	57.50	26.51	34.75	8.69	137.99	63.62
4	25.50	21	2.96E+07	1.02E-01	2.99E+03	3.99	1.38	1.97	1.82	7.86	7.25	0.134	0.536	14.91	3.73	58.65	27.05	35.79	8.95	140.75	64.91
5	27.00	22	2.96E+07	1.02E-01	3.11E+03	3.96	1.39	1.97	1.82	7.80	7.20	0.131	0.524	15.28	3.82	59.59	27.49	36.66	9.17	143.03	65.99
6	28.50	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.59	3.90	60.40	27.88	37.41	9.35	144.97	66.90
7	30.00	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.505	15.85	3.96	61.07	28.19	38.03	9.51	146.57	67.65

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-10)	-
Chainage	0-372	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	208.65	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	14.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-10)	1.00	22.00	19.50	15.00	311.16	136.47	11.22	2.80
BH-(-10)	1.00	23.50	21.00	16.50	331.82	152.59	11.49	2.87
BH-(-10)	1.00	25.00	22.50	18.00	352.49	168.70	11.87	2.97
BH-(-10)	1.00	26.50	24.00	19.50	373.16	184.82	12.19	3.05
BH-(-10)	1.00	28.00	25.50	21.00	393.83	200.94	12.45	3.11
BH-(-10)	1.00	29.50	27.00	22.50	414.49	217.05	12.67	3.17
BH-(-10)	1.00	30.00	27.50	23.00	421.38	222.43	12.86	3.21

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	11.96	23.93	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	35.89	47.85	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.55	0.02	23	-	6.00	8.68	1.00	-	6.25	7.00	61.01	74.18	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.55	0.02	23	-	6.00	8.68	1.00	-	7.75	8.50	87.34	100.50	4.71	16.58	72.94	89.52	35.81	13.99
5	8.50	10.00	1.50	Granular	17.55	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	113.66	126.83	4.71	23.46	115.68	155.72	62.29	22.21
6	10.00	11.50	1.50	Granular	17.55	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	139.99	153.15	4.71	28.89	138.26	207.18	82.87	31.94
7	11.50	13.00	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	167.03	180.90	4.71	37.22	231.13	337.28	134.91	44.02
8	13.00	14.50	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	194.78	208.65	4.71	43.41	265.05	414.60	165.84	57.82
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	208.65	208.65	4.71	48.22	299.31	497.09	198.84	72.97
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	208.65	208.65	4.71	48.22	299.31	545.32	218.13	88.12
11	17.50	19.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	208.65	208.65	4.71	51.67	376.89	674.56	269.82	104.24
12	19.00	20.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	208.65	208.65	4.71	51.67	376.89	726.23	290.49	120.36
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	208.65	208.65	4.71	51.67	376.89	777.89	311.16	136.47
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	208.65	208.65	4.71	51.67	376.89	829.56	331.82	152.59
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	208.65	208.65	4.71	51.67	376.89	881.23	352.49	168.70
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	208.65	208.65	4.71	51.67	376.89	932.90	373.16	184.82
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	208.65	208.65	4.71	51.67	376.89	984.57	393.83	200.94
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	208.65	208.65	4.71	51.67	376.89	1036.23	414.49	217.05
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	208.65	208.65	1.57	17.22	376.89	1053.46	421.38	222.43

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.68E+03	3.52	1.99	1.93	1.80	6.78	6.35	0.178	0.713	11.22	2.80	38.04	17.82	26.92	6.73	91.29	42.77
2	22.50	20	2.96E+07	4.91E-02	2.78E+03	3.50	2.00	1.92	1.80	6.73	6.31	0.174	0.696	11.49	2.87	38.65	18.11	27.58	6.89	92.76	43.48
3	24.00	21	2.96E+07	4.91E-02	2.93E+03	3.46	2.02	1.92	1.80	6.66	6.24	0.169	0.674	11.87	2.97	39.49	18.52	28.48	7.12	94.78	44.44
4	25.50	21	2.96E+07	4.91E-02	3.05E+03	3.43	2.04	1.92	1.80	6.60	6.19	0.164	0.657	12.19	3.05	40.20	18.85	29.25	7.31	96.47	45.25
5	27.00	22	2.96E+07	4.91E-02	3.16E+03	3.41	2.05	1.92	1.80	6.55	6.15	0.161	0.643	12.45	3.11	40.77	19.13	29.88	7.47	97.86	45.91
6	28.50	23	2.96E+07	4.91E-02	3.25E+03	3.39	2.07	1.92	1.80	6.51	6.11	0.158	0.631	12.67	3.17	41.26	19.36	30.42	7.60	99.03	46.47
7	30.00	23	2.96E+07	4.91E-02	3.32E+03	3.37	2.07	1.92	1.80	6.48	6.08	0.156	0.622	12.86	3.21	41.66	19.55	30.85	7.71	99.98	46.92

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-10)	-
Chainage	0-372	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	239.23	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	14.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-10)	1.20	22.00	19.50	15.00	455.93	179.58	14.59	3.65
BH-(-10)	1.20	23.50	21.00	16.50	484.36	201.86	14.95	3.74
BH-(-10)	1.20	25.00	22.50	18.00	512.80	224.14	15.44	3.86
BH-(-10)	1.20	26.50	24.00	19.50	541.23	246.42	15.86	3.96
BH-(-10)	1.20	28.00	25.50	21.00	569.67	268.70	16.20	4.05
BH-(-10)	1.20	29.50	27.00	22.50	598.10	290.98	16.50	4.12
BH-(-10)	1.20	30.00	27.50	23.00	607.58	298.40	16.73	4.18

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	11.96	23.93	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	15.95	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	35.89	47.85	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.55	0.02	23	-	6.00	8.68	1.00	-	6.25	7.00	61.01	74.18	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.55	0.02	23	-	6.00	8.68	1.00	-	7.75	8.50	87.34	100.50	5.65	19.90	106.23	126.13	50.45	19.03
5	8.50	10.00	1.50	Granular	17.55	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	113.66	126.83	5.65	28.15	168.57	216.61	86.65	29.29
6	10.00	11.50	1.50	Granular	17.55	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	139.99	153.15	5.65	34.66	201.08	283.79	113.52	41.37
7	11.50	13.00	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	167.03	180.90	5.65	44.67	335.73	463.11	185.24	56.25
8	13.00	14.50	1.50	Granular	18.50	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	194.78	208.65	5.65	52.09	384.56	564.03	225.61	73.21
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	216.30	223.94	5.65	59.99	463.75	703.20	281.28	92.38
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	231.59	239.23	5.65	64.23	494.67	798.35	319.34	112.74
11	17.50	19.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	239.23	239.23	5.65	71.09	622.87	997.64	399.06	135.02
12	19.00	20.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	239.23	239.23	5.65	71.09	622.87	1068.73	427.49	157.30
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	239.23	239.23	5.65	71.09	622.87	1139.81	455.93	179.58
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	239.23	239.23	5.65	71.09	622.87	1210.90	484.36	201.86
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	239.23	239.23	5.65	71.09	622.87	1281.99	512.80	224.14
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	239.23	239.23	5.65	71.09	622.87	1353.08	541.23	246.42
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	239.23	239.23	5.65	71.09	622.87	1424.17	569.67	268.70
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	239.23	239.23	5.65	71.09	622.87	1495.25	598.10	290.98
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	239.23	239.23	1.88	23.70	622.87	1518.95	607.58	298.40

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.68E+03	4.07	1.72	1.94	1.81	7.92	7.38	0.137	0.548	14.59	3.65	57.80	26.92	35.02	8.76	138.72	64.60
2	22.50	20	2.96E+07	1.02E-01	2.78E+03	4.04	1.73	1.94	1.81	7.86	7.32	0.134	0.535	14.95	3.74	58.74	27.36	35.88	8.97	140.97	65.67
3	24.00	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.75	1.94	1.81	7.77	7.25	0.130	0.518	15.44	3.86	60.02	27.97	37.05	9.26	144.04	67.13
4	25.50	21	2.96E+07	1.02E-01	3.05E+03	3.97	1.76	1.94	1.81	7.71	7.19	0.126	0.505	15.86	3.96	61.09	28.48	38.06	9.51	146.62	68.36
5	27.00	22	2.96E+07	1.02E-01	3.16E+03	3.94	1.77	1.94	1.81	7.65	7.14	0.123	0.494	16.20	4.05	61.98	28.90	38.88	9.72	148.74	69.37
6	28.50	23	2.96E+07	1.02E-01	3.25E+03	3.92	1.78	1.94	1.81	7.60	7.09	0.121	0.485	16.50	4.12	62.72	29.26	39.59	9.90	150.54	70.22
7	30.00	23	2.96E+07	1.02E-01	3.32E+03	3.90	1.79	1.94	1.81	7.57	7.06	0.120	0.478	16.73	4.18	63.32	29.54	40.16	10.04	151.98	70.91

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-02)	-
Chainage	0+499	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	92.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-02)	1.00	22.00	19.50	16.50	141.36	75.19	10.75	2.69
BH-(-02)	1.00	23.50	21.00	18.00	150.52	83.25	11.04	2.76
BH-(-02)	1.00	25.00	22.50	19.50	159.67	91.30	11.40	2.85
BH-(-02)	1.00	26.50	24.00	21.00	168.82	99.36	11.70	2.93
BH-(-02)	1.00	28.00	25.50	22.50	177.97	107.41	11.96	2.99
BH-(-02)	1.00	29.50	27.00	24.00	187.12	115.47	12.17	3.04
BH-(-02)	1.00	30.00	27.50	24.50	190.17	118.16	12.35	3.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.05	21	-	2.00	6.49	1.00	-	3.25	4.00	4.61	9.22	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.14	0.05	21	-	2.00	6.49	1.00	-	4.75	5.50	13.82	18.43	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.74	0.05	21	-	2.00	6.49	1.00	-	6.25	7.00	24.24	30.05	4.71	4.20	15.98	20.18	8.07	8.87
4	7.00	8.50	1.50	Granular	7.74	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	35.85	41.66	4.71	7.40	38.78	50.38	20.15	12.59
5	8.50	10.00	1.50	Granular	7.74	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	47.47	53.28	4.71	9.80	48.74	70.13	28.05	16.99
6	10.00	11.50	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	59.80	66.32	4.71	13.33	85.77	120.49	48.20	22.37
7	11.50	13.00	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	72.84	79.36	4.71	16.23	101.71	152.66	61.06	28.56
8	13.00	14.50	1.50	Granular	8.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	85.88	92.40	4.71	19.85	135.13	205.93	82.37	35.77
9	14.50	16.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	92.40	92.40	4.71	21.35	136.06	228.21	91.29	43.40
10	16.00	17.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	92.40	92.40	4.71	22.12	153.66	267.93	107.17	51.24
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	92.40	92.40	4.71	22.12	153.66	290.05	116.02	59.08
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	92.40	92.40	4.71	22.88	171.26	330.53	132.21	67.14
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	92.40	92.40	4.71	22.88	171.26	353.41	141.36	75.19
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	92.40	92.40	4.71	22.88	171.26	376.29	150.52	83.25
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	92.40	92.40	4.71	22.88	171.26	399.17	159.67	91.30
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	92.40	92.40	4.71	22.88	171.26	422.05	168.82	99.36
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	92.40	92.40	4.71	22.88	171.26	444.93	177.97	107.41
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	92.40	92.40	4.71	22.88	171.26	467.81	187.12	115.47
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	92.40	92.40	1.57	7.63	171.26	475.43	190.17	118.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.744	10.75	2.69	36.97	17.15	25.79	6.45	88.72	41.15
2	22.50	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.181	0.725	11.04	2.76	37.63	17.46	26.49	6.62	90.31	41.90
3	24.00	21	2.96E+07	4.91E-02	2.96E+03	3.45	1.59	1.95	1.81	6.75	6.26	0.175	0.702	11.40	2.85	38.44	17.84	27.35	6.84	92.26	42.82
4	25.50	22	2.96E+07	4.91E-02	3.09E+03	3.42	1.61	1.95	1.81	6.69	6.21	0.171	0.684	11.70	2.93	39.13	18.17	28.09	7.02	93.90	43.60
5	27.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.96	2.99	39.69	18.43	28.70	7.17	95.25	44.24
6	28.50	23	2.96E+07	4.91E-02	3.28E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.657	12.17	3.04	40.17	18.66	29.22	7.30	96.40	44.79
7	30.00	24	2.96E+07	4.91E-02	3.36E+03	3.37	1.63	1.95	1.81	6.57	6.10	0.162	0.648	12.35	3.09	40.56	18.85	29.64	7.41	97.33	45.23

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-02)	-
Chainage	0+499	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	122.98	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-02)	1.20	22.00	19.50	16.50	232.40	106.02	13.96	3.49
BH-(-02)	1.20	23.50	21.00	18.00	247.02	118.63	14.34	3.58
BH-(-02)	1.20	25.00	22.50	19.50	261.64	131.24	14.80	3.70
BH-(-02)	1.20	26.50	24.00	21.00	276.25	143.84	15.20	3.80
BH-(-02)	1.20	28.00	25.50	22.50	290.87	156.45	15.53	3.88
BH-(-02)	1.20	29.50	27.00	24.00	305.49	169.06	15.81	3.95
BH-(-02)	1.20	30.00	27.50	24.50	310.36	173.26	16.04	4.01

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.05	21	-	2.00	6.49	1.00	-	3.25	4.00	4.61	9.22	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.14	0.05	21	-	2.00	6.49	1.00	-	4.75	5.50	13.82	18.43	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.74	0.05	21	-	2.00	6.49	1.00	-	6.25	7.00	24.24	30.05	5.65	5.04	23.18	28.22	11.29	12.50
4	7.00	8.50	1.50	Granular	7.74	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	35.85	41.66	5.65	8.88	56.72	70.64	28.26	17.36
5	8.50	10.00	1.50	Granular	7.74	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	47.47	53.28	5.65	11.75	71.06	96.74	38.70	23.02
6	10.00	11.50	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	59.80	66.32	5.65	15.99	124.87	166.54	66.61	29.88
7	11.50	13.00	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	72.84	79.36	5.65	19.48	147.82	208.96	83.58	37.70
8	13.00	14.50	1.50	Granular	8.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	85.88	92.40	5.65	23.82	196.14	281.10	112.44	46.75
9	14.50	16.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	100.04	107.69	5.65	27.75	228.66	341.37	136.55	56.89
10	16.00	17.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	115.33	122.98	5.65	33.13	293.17	439.00	175.60	68.54
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	122.98	122.98	5.65	35.32	293.17	474.33	189.73	80.81
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	122.98	122.98	5.65	36.54	326.76	544.46	217.78	93.42
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	122.98	122.98	5.65	36.54	326.76	581.00	232.40	106.02
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	122.98	122.98	5.65	36.54	326.76	617.55	247.02	118.63
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	122.98	122.98	5.65	36.54	326.76	654.09	261.64	131.24
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	122.98	122.98	5.65	36.54	326.76	690.63	276.25	143.84
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	122.98	122.98	5.65	36.54	326.76	727.18	290.87	156.45
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	122.98	122.98	5.65	36.54	326.76	763.72	305.49	169.06
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	122.98	122.98	1.88	12.18	326.76	775.90	310.36	173.26

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.573	13.96	3.49	56.12	25.86	33.51	8.38	134.70	62.07
2	22.50	20	2.96E+07	1.02E-01	2.82E+03	4.03	1.36	1.98	1.82	7.97	7.35	0.139	0.558	14.34	3.58	57.13	26.33	34.41	8.60	137.10	63.20
3	24.00	21	2.96E+07	1.02E-01	2.96E+03	3.99	1.38	1.97	1.82	7.88	7.27	0.135	0.540	14.80	3.70	58.36	26.91	35.53	8.88	140.07	64.59
4	25.50	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.39	1.97	1.82	7.81	7.21	0.132	0.526	15.20	3.80	59.40	27.40	36.49	9.12	142.56	65.77
5	27.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.53	3.88	60.26	27.81	37.28	9.32	144.62	66.74
6	28.50	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.506	15.81	3.95	60.98	28.15	37.95	9.49	146.36	67.56
7	30.00	24	2.96E+07	1.02E-01	3.36E+03	3.90	1.41	1.97	1.82	7.68	7.09	0.125	0.499	16.04	4.01	61.57	28.43	38.50	9.63	147.77	68.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-03)	-
Chainage	0+344	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	96.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-03)	1.00	22.00	19.50	16.50	145.93	76.49	10.42	2.60
BH-(-03)	1.00	23.50	21.00	18.00	155.46	84.81	10.74	2.69
BH-(-03)	1.00	25.00	22.50	19.50	164.99	93.13	11.12	2.78
BH-(-03)	1.00	26.50	24.00	21.00	174.52	101.46	11.45	2.86
BH-(-03)	1.00	28.00	25.50	22.50	184.05	109.78	11.72	2.93
BH-(-03)	1.00	29.50	27.00	24.00	193.58	118.10	11.95	2.99
BH-(-03)	1.00	30.00	27.50	24.50	196.76	120.87	12.14	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	4.61	9.22	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.74	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	15.02	20.83	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.74	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	26.64	32.45	4.71	4.84	20.62	25.46	10.18	9.05
4	7.00	8.50	1.50	Granular	7.74	0.02	22	-	4.00	7.59	1.00	-	7.75	8.50	38.25	44.06	4.71	6.95	27.57	39.35	15.74	12.65
5	8.50	10.00	1.50	Granular	8.69	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	50.58	57.10	4.71	10.44	52.39	74.62	29.85	17.22
6	10.00	11.50	1.50	Granular	8.69	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	63.62	70.14	4.71	13.13	63.58	98.93	39.57	22.54
7	11.50	13.00	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	76.66	83.18	4.71	17.08	106.38	158.81	63.53	28.98
8	13.00	14.50	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	89.70	96.22	4.71	19.99	122.32	194.74	77.90	36.22
9	14.50	16.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	96.22	96.22	4.71	22.24	141.12	235.78	94.31	44.10
10	16.00	17.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	96.22	96.22	4.71	22.24	141.12	258.02	103.21	51.97
11	17.50	19.00	1.50	Granular	9.69	0.06	29	-	17.60	20.13	1.00	-	18.25	19.00	96.22	96.22	4.71	23.03	159.38	299.32	119.73	60.07
12	19.00	20.50	1.50	Granular	9.69	0.06	29	-	17.60	20.13	1.00	-	19.75	20.50	96.22	96.22	4.71	23.03	159.38	322.35	128.94	68.17
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	96.22	96.22	4.71	23.83	178.03	364.82	145.93	76.49
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	96.22	96.22	4.71	23.83	178.03	388.65	155.46	84.81
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	96.22	96.22	4.71	23.83	178.03	412.47	164.99	93.13
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	96.22	96.22	4.71	23.83	178.03	436.30	174.52	101.46
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	96.22	96.22	4.71	23.83	178.03	460.13	184.05	109.78
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	96.22	96.22	4.71	23.83	178.03	483.95	193.58	118.10
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	96.22	96.22	1.57	7.94	178.03	491.90	196.76	120.87

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.57E+03	3.55	1.55	1.96	1.82	6.95	6.44	0.192	0.768	10.42	2.60	36.21	16.79	25.01	6.25	86.91	40.29
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.74	2.69	36.95	17.14	25.78	6.44	88.68	41.13
3	24.00	20	2.96E+07	4.91E-02	2.85E+03	3.48	1.58	1.96	1.81	6.80	6.31	0.180	0.719	11.12	2.78	37.82	17.55	26.70	6.67	90.78	42.12
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.74	6.25	0.175	0.699	11.45	2.86	38.56	17.90	27.48	6.87	92.54	42.96
5	27.00	22	2.96E+07	4.91E-02	3.09E+03	3.42	1.61	1.95	1.81	6.68	6.21	0.171	0.683	11.72	2.93	39.16	18.18	28.12	7.03	93.99	43.64
6	28.50	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.95	2.99	39.68	18.43	28.68	7.17	95.22	44.23
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.62	1.95	1.81	6.61	6.14	0.165	0.659	12.14	3.03	40.09	18.63	29.13	7.28	96.22	44.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-03)	-
Chainage	0+344	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.30	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-03)	1.20	22.00	19.50	16.50	236.10	106.95	13.54	3.38
BH-(-03)	1.20	23.50	21.00	18.00	250.99	119.75	13.95	3.49
BH-(-03)	1.20	25.00	22.50	19.50	265.89	132.55	14.45	3.61
BH-(-03)	1.20	26.50	24.00	21.00	280.78	145.35	14.87	3.72
BH-(-03)	1.20	28.00	25.50	22.50	295.67	158.15	15.22	3.81
BH-(-03)	1.20	29.50	27.00	24.00	310.57	170.95	15.52	3.88
BH-(-03)	1.20	30.00	27.50	24.50	315.53	175.22	15.77	3.94

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	4.61	9.22	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.74	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	15.02	20.83	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.74	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	26.64	32.45	5.65	5.80	30.05	35.85	14.34	12.71
4	7.00	8.50	1.50	Granular	7.74	0.02	22	-	4.00	7.59	1.00	-	7.75	8.50	38.25	44.06	5.65	8.34	40.05	54.19	21.68	17.42
5	8.50	10.00	1.50	Granular	8.69	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	50.58	57.10	5.65	12.53	76.43	103.10	41.24	23.30
6	10.00	11.50	1.50	Granular	8.69	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	63.62	70.14	5.65	15.75	92.54	134.96	53.98	30.09
7	11.50	13.00	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	76.66	83.18	5.65	20.50	154.55	217.47	86.99	38.20
8	13.00	14.50	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	89.70	96.22	5.65	23.99	177.50	264.41	105.76	47.29
9	14.50	16.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	103.49	110.76	5.65	28.70	234.34	349.96	139.98	57.71
10	16.00	17.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	118.03	125.30	5.65	32.73	263.75	412.09	164.84	69.25
11	17.50	19.00	1.50	Granular	9.69	0.06	29	-	17.60	20.13	1.00	-	18.25	19.00	125.30	125.30	5.65	35.99	297.88	482.22	192.89	81.70
12	19.00	20.50	1.50	Granular	9.69	0.06	29	-	17.60	20.13	1.00	-	19.75	20.50	125.30	125.30	5.65	35.99	297.88	518.21	207.29	94.15
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	125.30	125.30	5.65	37.23	332.68	590.25	236.10	106.95
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	125.30	125.30	5.65	37.23	332.68	627.48	250.99	119.75
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	125.30	125.30	5.65	37.23	332.68	664.71	265.89	132.55
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	125.30	125.30	5.65	37.23	332.68	701.95	280.78	145.35
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	125.30	125.30	5.65	37.23	332.68	739.18	295.67	158.15
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	125.30	125.30	5.65	37.23	332.68	776.42	310.57	170.95
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	125.30	125.30	1.88	12.41	332.68	788.83	315.53	175.22

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.57E+03	4.11	1.34	1.98	1.82	8.12	7.48	0.148	0.591	13.54	3.38	54.98	25.32	32.49	8.12	131.94	60.77
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.573	13.95	3.49	56.10	25.85	33.49	8.37	134.64	62.04
3	24.00	20	2.96E+07	1.02E-01	2.85E+03	4.02	1.37	1.97	1.82	7.95	7.33	0.138	0.554	14.45	3.61	57.42	26.47	34.68	8.67	137.82	63.53
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.87	3.72	58.54	27.00	35.69	8.92	140.49	64.79
5	27.00	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.39	1.97	1.82	7.81	7.21	0.131	0.526	15.22	3.81	59.46	27.43	36.54	9.13	142.69	65.83
6	28.50	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.52	3.88	60.24	27.80	37.26	9.31	144.57	66.71
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.507	15.77	3.94	60.87	28.09	37.85	9.46	146.09	67.43

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-05)	-
Chainage	0+094	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	99.67	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-05)	1.00	22.00	19.50	15.00	149.54	77.31	10.87	2.72
BH-(-05)	1.00	23.50	21.00	16.50	159.41	85.87	11.10	2.78
BH-(-05)	1.00	25.00	22.50	18.00	169.28	94.43	11.51	2.88
BH-(-05)	1.00	26.50	24.00	19.50	179.16	102.99	11.86	2.97
BH-(-05)	1.00	28.00	25.50	21.00	189.03	111.55	12.15	3.04
BH-(-05)	1.00	29.50	27.00	22.50	198.90	120.11	12.40	3.10
BH-(-05)	1.00	30.00	27.50	23.00	202.19	122.97	12.61	3.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.05	21	-	2.00	6.49	1.00	-	3.25	4.00	4.61	9.22	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.14	0.05	21	-	2.00	6.49	1.00	-	4.75	5.50	13.82	18.43	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.69	0.05	21	-	2.00	6.49	1.00	-	6.25	7.00	24.20	29.97	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.69	0.05	21	-	2.00	6.49	1.00	-	7.75	8.50	35.74	41.51	4.71	6.20	21.83	28.03	11.21	11.08
5	8.50	10.00	1.50	Granular	9.69	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	48.78	56.05	4.71	10.47	62.83	79.49	31.80	15.66
6	10.00	11.50	1.50	Granular	9.69	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	63.32	70.59	4.71	13.59	77.95	108.20	43.28	21.12
7	11.50	13.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	77.86	85.13	4.71	18.00	125.55	173.79	69.52	27.80
8	13.00	14.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	92.40	99.67	4.71	21.36	145.96	215.57	86.23	35.43
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	99.67	99.67	4.71	23.86	164.85	258.32	103.33	43.76
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	99.67	99.67	4.71	23.86	164.85	282.18	112.87	52.09
11	17.50	19.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	99.67	99.67	4.71	23.86	164.85	306.03	122.41	60.42
12	19.00	20.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	99.67	99.67	4.71	23.86	165.20	330.24	132.10	68.75
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	99.67	99.67	4.71	24.68	184.13	373.85	149.54	77.31
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	99.67	99.67	4.71	24.68	184.13	398.53	159.41	85.87
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	99.67	99.67	4.71	24.68	184.13	423.21	169.28	94.43
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	99.67	99.67	4.71	24.68	184.13	447.89	179.16	102.99
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	99.67	99.67	4.71	24.68	184.13	472.57	189.03	111.55
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	99.67	99.67	4.71	24.68	184.13	497.25	198.90	120.11
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	99.67	99.67	1.57	8.23	184.13	505.48	202.19	122.97

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.97	1.93	1.80	6.85	6.42	0.184	0.736	10.87	2.72	37.25	17.44	26.09	6.52	89.39	41.86
2	22.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.98	1.93	1.80	6.81	6.38	0.180	0.721	11.10	2.78	37.77	17.69	26.64	6.66	90.65	42.47
3	24.00	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.174	0.695	11.51	2.88	38.70	18.14	27.63	6.91	92.88	43.53
4	25.50	21	2.96E+07	4.91E-02	2.93E+03	3.46	2.02	1.92	1.80	6.66	6.24	0.169	0.674	11.86	2.97	39.48	18.51	28.47	7.12	94.76	44.43
5	27.00	21	2.96E+07	4.91E-02	3.04E+03	3.43	2.04	1.92	1.80	6.60	6.19	0.165	0.658	12.15	3.04	40.13	18.82	29.17	7.29	96.31	45.17
6	28.50	22	2.96E+07	4.91E-02	3.14E+03	3.41	2.05	1.92	1.80	6.56	6.15	0.161	0.645	12.40	3.10	40.67	19.08	29.77	7.44	97.62	45.79
7	30.00	23	2.96E+07	4.91E-02	3.22E+03	3.40	2.06	1.92	1.80	6.52	6.12	0.159	0.635	12.61	3.15	41.12	19.29	30.26	7.56	98.69	46.30

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-05)	-
Chainage	0+094	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	128.75	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-05)	1.20	22.00	19.50	15.00	241.13	108.02	14.14	3.53
BH-(-05)	1.20	23.50	21.00	16.50	256.44	121.10	14.44	3.61
BH-(-05)	1.20	25.00	22.50	18.00	271.74	134.19	14.98	3.74
BH-(-05)	1.20	26.50	24.00	19.50	287.04	147.28	15.44	3.86
BH-(-05)	1.20	28.00	25.50	21.00	302.35	160.37	15.82	3.95
BH-(-05)	1.20	29.50	27.00	22.50	317.65	173.45	16.14	4.04
BH-(-05)	1.20	30.00	27.50	23.00	322.75	177.82	16.41	4.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.05	21	-	2.00	6.49	1.00	-	3.25	4.00	4.61	9.22	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.14	0.05	21	-	2.00	6.49	1.00	-	4.75	5.50	13.82	18.43	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.69	0.05	21	-	2.00	6.49	1.00	-	6.25	7.00	24.20	29.97	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.69	0.05	21	-	2.00	6.49	1.00	-	7.75	8.50	35.74	41.51	5.65	7.43	31.62	39.05	15.62	15.54
5	8.50	10.00	1.50	Granular	9.69	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	48.78	56.05	5.65	12.56	91.78	111.78	44.71	21.43
6	10.00	11.50	1.50	Granular	9.69	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	63.32	70.59	5.65	16.31	113.55	149.86	59.94	28.37
7	11.50	13.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	77.86	85.13	5.65	21.59	182.51	240.41	96.16	36.80
8	13.00	14.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	92.40	99.67	5.65	25.63	211.92	295.44	118.18	46.35
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	106.94	114.21	5.65	30.72	272.55	386.79	154.72	57.32
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	121.48	128.75	5.65	34.90	305.76	454.90	181.96	69.47
11	17.50	19.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	128.75	128.75	5.65	36.98	305.76	491.89	196.75	82.20
12	19.00	20.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	128.75	128.75	5.65	36.98	306.36	529.47	211.79	94.93
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	128.75	128.75	5.65	38.26	341.47	602.83	241.13	108.02
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	128.75	128.75	5.65	38.26	341.47	641.09	256.44	121.10
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	128.75	128.75	5.65	38.26	341.47	679.35	271.74	134.19
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	128.75	128.75	5.65	38.26	341.47	717.61	287.04	147.28
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	128.75	128.75	5.65	38.26	341.47	755.87	302.35	160.37
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	128.75	128.75	5.65	38.26	341.47	794.13	317.65	173.45
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	128.75	128.75	1.88	12.75	341.47	806.88	322.75	177.82

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.12	1.70	1.95	1.81	8.01	7.45	0.141	0.566	14.14	3.53	56.59	26.34	33.93	8.48	135.82	63.22
2	22.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.71	1.94	1.81	7.95	7.40	0.139	0.554	14.44	3.61	57.39	26.72	34.65	8.66	137.75	64.14
3	24.00	20	2.96E+07	1.02E-01	2.79E+03	4.04	1.73	1.94	1.81	7.85	7.32	0.134	0.534	14.98	3.74	58.81	27.40	35.95	8.99	141.15	65.76
4	25.50	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.75	1.94	1.81	7.78	7.25	0.130	0.518	15.44	3.86	60.01	27.97	37.05	9.26	144.02	67.12
5	27.00	21	2.96E+07	1.02E-01	3.04E+03	3.97	1.76	1.94	1.81	7.71	7.19	0.126	0.506	15.82	3.95	60.99	28.43	37.96	9.49	146.37	68.24
6	28.50	22	2.96E+07	1.02E-01	3.14E+03	3.95	1.77	1.94	1.81	7.66	7.14	0.124	0.496	16.14	4.04	61.82	28.83	38.74	9.69	148.38	69.19
7	30.00	23	2.96E+07	1.02E-01	3.22E+03	3.93	1.78	1.94	1.81	7.62	7.11	0.122	0.488	16.41	4.10	62.50	29.15	39.38	9.85	150.01	69.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-06)	-
Chainage	0-015	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	95.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-06)	1.00	22.00	19.50	16.50	143.65	75.34	10.59	2.65
BH-(-06)	1.00	23.50	21.00	18.00	153.09	83.60	10.78	2.70
BH-(-06)	1.00	25.00	22.50	19.50	162.53	91.86	11.17	2.79
BH-(-06)	1.00	26.50	24.00	21.00	171.97	100.12	11.49	2.87
BH-(-06)	1.00	28.00	25.50	22.50	181.41	108.37	11.77	2.94
BH-(-06)	1.00	29.50	27.00	24.00	190.85	116.63	12.00	3.00
BH-(-06)	1.00	30.00	27.50	24.50	194.00	119.39	12.19	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	6.25	7.00	26.98	32.37	4.71	5.12	23.86	28.98	11.59	9.13
4	7.00	8.50	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	7.75	8.50	37.77	43.16	4.71	7.17	31.24	43.53	17.41	12.79
5	8.50	10.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	48.56	53.95	4.71	10.02	49.10	71.41	28.57	17.24
6	10.00	11.50	1.50	Granular	8.69	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	60.47	66.99	4.71	12.48	60.88	95.67	38.27	22.39
7	11.50	13.00	1.50	Granular	8.69	0.08	26	-	11.90	13.19	1.00	-	12.25	13.00	73.51	80.03	4.71	15.78	87.29	137.86	55.14	28.45
8	13.00	14.50	1.50	Granular	10.19	0.08	26	-	11.90	13.19	1.00	-	13.75	14.50	87.68	95.32	4.71	18.82	103.90	173.28	69.31	35.37
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	95.32	95.32	4.71	22.03	140.17	231.58	92.63	43.19
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	95.32	95.32	4.71	22.03	140.17	253.61	101.44	51.01
11	17.50	19.00	1.50	Granular	10.19	0.01	29	-	17.60	20.13	1.00	-	18.25	19.00	95.32	95.32	4.71	22.82	158.30	294.56	117.82	59.04
12	19.00	20.50	1.50	Granular	10.19	0.01	29	-	17.60	20.13	1.00	-	19.75	20.50	95.32	95.32	4.71	22.82	158.30	317.38	126.95	67.08
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	95.32	95.32	4.71	23.60	176.43	359.11	143.65	75.34
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	95.32	95.32	4.71	23.60	176.43	382.72	153.09	83.60
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	95.32	95.32	4.71	23.60	176.43	406.32	162.53	91.86
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	95.32	95.32	4.71	23.60	176.43	429.93	171.97	100.12
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	95.32	95.32	4.71	23.60	176.43	453.53	181.41	108.37
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	95.32	95.32	4.71	23.60	176.43	477.13	190.85	116.63
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	95.32	95.32	1.57	7.87	176.43	485.00	194.00	119.39

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.56	1.96	1.82	6.91	6.41	0.189	0.755	10.59	2.65	36.61	16.98	25.42	6.36	87.87	40.74
2	22.50	19	2.96E+07	4.91E-02	2.72E+03	3.51	1.57	1.96	1.81	6.87	6.37	0.186	0.742	10.78	2.70	37.04	17.18	25.87	6.47	88.90	41.23
3	24.00	20	2.96E+07	4.91E-02	2.87E+03	3.47	1.58	1.95	1.81	6.79	6.30	0.179	0.716	11.17	2.79	37.92	17.60	26.80	6.70	91.01	42.23
4	25.50	21	2.96E+07	4.91E-02	3.00E+03	3.44	1.60	1.95	1.81	6.73	6.25	0.174	0.696	11.49	2.87	38.66	17.95	27.59	6.90	92.78	43.07
5	27.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.67	6.20	0.170	0.680	11.77	2.94	39.27	18.24	28.24	7.06	94.25	43.77
6	28.50	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.667	12.00	3.00	39.79	18.48	28.80	7.20	95.49	44.36
7	30.00	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.656	12.19	3.05	40.21	18.68	29.27	7.32	96.51	44.84

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-06)	-
Chainage	0-015	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-06)	1.20	22.00	19.50	16.50	235.43	106.05	13.76	3.44
BH-(-06)	1.20	23.50	21.00	18.00	250.39	118.90	14.00	3.50
BH-(-06)	1.20	25.00	22.50	19.50	265.35	131.75	14.51	3.63
BH-(-06)	1.20	26.50	24.00	21.00	280.32	144.60	14.93	3.73
BH-(-06)	1.20	28.00	25.50	22.50	295.28	157.45	15.29	3.82
BH-(-06)	1.20	29.50	27.00	24.00	310.25	170.30	15.59	3.90
BH-(-06)	1.20	30.00	27.50	24.50	315.24	174.59	15.84	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	6.25	7.00	26.98	32.37	5.65	6.15	34.85	40.99	16.40	12.80
4	7.00	8.50	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	7.75	8.50	37.77	43.16	5.65	8.60	45.48	60.23	24.09	17.59
5	8.50	10.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	48.56	53.95	5.65	12.02	71.52	98.30	39.32	23.33
6	10.00	11.50	1.50	Granular	8.69	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	60.47	66.99	5.65	14.97	88.65	130.40	52.16	29.90
7	11.50	13.00	1.50	Granular	8.69	0.08	26	-	11.90	13.19	1.00	-	12.25	13.00	73.51	80.03	5.65	18.93	126.88	187.56	75.02	37.57
8	13.00	14.50	1.50	Granular	10.19	0.08	26	-	11.90	13.19	1.00	-	13.75	14.50	87.68	95.32	5.65	22.58	150.99	234.25	93.70	46.27
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	102.97	110.61	5.65	28.56	234.57	346.39	138.56	56.64
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	118.26	125.90	5.65	32.80	265.49	410.11	164.04	68.20
11	17.50	19.00	1.50	Granular	10.19	0.01	29	-	17.60	20.13	1.00	-	18.25	19.00	125.90	125.90	5.65	36.16	299.85	480.63	192.25	80.70
12	19.00	20.50	1.50	Granular	10.19	0.01	29	-	17.60	20.13	1.00	-	19.75	20.50	125.90	125.90	5.65	36.16	299.85	516.79	206.72	93.20
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	125.90	125.90	5.65	37.41	334.21	588.56	235.43	106.05
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	125.90	125.90	5.65	37.41	334.21	625.97	250.39	118.90
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	125.90	125.90	5.65	37.41	334.21	663.39	265.35	131.75
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	125.90	125.90	5.65	37.41	334.21	700.80	280.32	144.60
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	125.90	125.90	5.65	37.41	334.21	738.21	295.28	157.45
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	125.90	125.90	5.65	37.41	334.21	775.62	310.25	170.30
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	125.90	125.90	1.88	12.47	334.21	788.09	315.24	174.59

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.35	1.98	1.82	8.08	7.44	0.145	0.581	13.76	3.44	55.58	25.61	33.02	8.26	133.40	61.45
2	22.50	19	2.96E+07	1.02E-01	2.72E+03	4.06	1.35	1.98	1.82	8.03	7.40	0.143	0.571	14.00	3.50	56.24	25.91	33.61	8.40	134.97	62.19
3	24.00	20	2.96E+07	1.02E-01	2.87E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.552	14.51	3.63	57.57	26.54	34.81	8.70	138.17	63.70
4	25.50	21	2.96E+07	1.02E-01	3.00E+03	3.98	1.38	1.97	1.82	7.86	7.25	0.134	0.536	14.93	3.73	58.69	27.07	35.84	8.96	140.87	64.97
5	27.00	22	2.96E+07	1.02E-01	3.11E+03	3.95	1.39	1.97	1.82	7.80	7.20	0.131	0.523	15.29	3.82	59.62	27.51	36.69	9.17	143.09	66.01
6	28.50	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.59	3.90	60.41	27.88	37.42	9.35	144.98	66.91
7	30.00	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.505	15.84	3.96	61.05	28.18	38.02	9.50	146.53	67.64

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-08)	-
Chainage	0-174	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	90.82	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-08)	1.00	22.00	19.50	16.50	139.29	74.52	10.89	2.72
BH-(-08)	1.00	23.50	21.00	18.00	148.28	82.47	11.17	2.79
BH-(-08)	1.00	25.00	22.50	19.50	157.28	90.41	11.52	2.88
BH-(-08)	1.00	26.50	24.00	21.00	166.28	98.36	11.82	2.95
BH-(-08)	1.00	28.00	25.50	22.50	175.27	106.30	12.06	3.02
BH-(-08)	1.00	29.50	27.00	24.00	184.27	114.25	12.27	3.07
BH-(-08)	1.00	30.00	27.50	24.50	187.27	116.90	12.44	3.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	4.71	5.57	30.60	36.16	14.46	9.26
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	4.71	7.79	39.85	53.21	21.28	13.09
5	8.50	10.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	48.56	53.95	4.71	10.02	49.10	72.48	28.99	17.54
6	10.00	11.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	59.35	64.74	4.71	12.25	58.36	93.98	37.59	22.62
7	11.50	13.00	1.50	Granular	8.69	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	71.26	77.78	4.71	15.88	99.78	151.29	60.52	28.72
8	13.00	14.50	1.50	Granular	8.69	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	84.30	90.82	4.71	18.79	115.72	186.01	74.40	35.63
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	90.82	90.82	4.71	21.74	151.16	243.20	97.28	43.36
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	90.82	90.82	4.71	21.74	151.16	264.94	105.97	51.10
11	17.50	19.00	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	90.82	90.82	4.71	21.74	151.16	286.68	114.67	58.84
12	19.00	20.50	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	90.82	90.82	4.71	21.74	151.16	308.42	123.37	66.57
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	90.82	90.82	4.71	22.49	168.47	348.22	139.29	74.52
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	90.82	90.82	4.71	22.49	168.47	370.71	148.28	82.47
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	90.82	90.82	4.71	22.49	168.47	393.20	157.28	90.41
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	90.82	90.82	4.71	22.49	168.47	415.69	166.28	98.36
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	90.82	90.82	4.71	22.49	168.47	438.18	175.27	106.30
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	90.82	90.82	4.71	22.49	168.47	460.67	184.27	114.25
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	90.82	90.82	1.57	7.50	168.47	468.16	187.27	116.90

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.76E+03	3.50	1.57	1.96	1.81	6.85	6.35	0.184	0.735	10.89	2.72	37.29	17.30	26.14	6.53	89.50	41.52
2	22.50	20	2.96E+07	4.91E-02	2.87E+03	3.47	1.58	1.95	1.81	6.79	6.30	0.179	0.716	11.17	2.79	37.93	17.60	26.80	6.70	91.02	42.24
3	24.00	21	2.96E+07	4.91E-02	3.01E+03	3.44	1.60	1.95	1.81	6.72	6.24	0.174	0.695	11.52	2.88	38.71	17.97	27.64	6.91	92.91	43.13
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.677	11.82	2.95	39.38	18.29	28.36	7.09	94.51	43.89
5	27.00	23	2.96E+07	4.91E-02	3.24E+03	3.39	1.62	1.95	1.81	6.62	6.15	0.166	0.663	12.06	3.02	39.92	18.55	28.95	7.24	95.82	44.51
6	28.50	23	2.96E+07	4.91E-02	3.32E+03	3.37	1.63	1.95	1.81	6.58	6.12	0.163	0.652	12.27	3.07	40.39	18.77	29.46	7.36	96.93	45.04
7	30.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	1.64	1.95	1.81	6.55	6.09	0.161	0.643	12.44	3.11	40.76	18.94	29.87	7.47	97.83	45.46

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-08)	-
Chainage	0-174	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	121.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-08)	1.20	22.00	19.50	16.50	229.55	105.15	14.15	3.54
BH-(-08)	1.20	23.50	21.00	18.00	243.98	117.63	14.51	3.63
BH-(-08)	1.20	25.00	22.50	19.50	258.41	130.10	14.96	3.74
BH-(-08)	1.20	26.50	24.00	21.00	272.84	142.58	15.35	3.84
BH-(-08)	1.20	28.00	25.50	22.50	287.27	155.05	15.67	3.92
BH-(-08)	1.20	29.50	27.00	24.00	301.70	167.53	15.94	3.99
BH-(-08)	1.20	30.00	27.50	24.50	306.51	171.69	16.17	4.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	5.65	6.68	44.87	51.55	20.62	12.95
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	5.65	9.35	58.20	74.23	29.69	17.95
5	8.50	10.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	48.56	53.95	5.65	12.02	71.52	99.58	39.83	23.69
6	10.00	11.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	59.35	64.74	5.65	14.70	84.85	127.60	51.04	30.18
7	11.50	13.00	1.50	Granular	8.69	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	71.26	77.78	5.65	19.06	145.05	206.85	82.74	37.89
8	13.00	14.50	1.50	Granular	8.69	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	84.30	90.82	5.65	22.55	167.99	252.35	100.94	46.58
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	98.47	106.11	5.65	28.28	254.64	367.28	146.91	56.87
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	113.76	121.40	5.65	32.68	289.57	434.88	173.95	68.40
11	17.50	19.00	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	121.40	121.40	5.65	34.87	289.57	469.76	187.90	80.54
12	19.00	20.50	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	121.40	121.40	5.65	34.87	289.57	504.63	201.85	92.68
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	121.40	121.40	5.65	36.07	322.75	573.88	229.55	105.15
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	121.40	121.40	5.65	36.07	322.75	609.96	243.98	117.63
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	121.40	121.40	5.65	36.07	322.75	646.03	258.41	130.10
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	121.40	121.40	5.65	36.07	322.75	682.10	272.84	142.58
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	121.40	121.40	5.65	36.07	322.75	718.18	287.27	155.05
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	121.40	121.40	5.65	36.07	322.75	754.25	301.70	167.53
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	121.40	121.40	1.88	12.02	322.75	766.28	306.51	171.69

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.76E+03	4.05	1.36	1.98	1.82	8.00	7.38	0.141	0.566	14.15	3.54	56.62	26.09	33.95	8.49	135.88	62.62
2	22.50	20	2.96E+07	1.02E-01	2.87E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.551	14.51	3.63	57.58	26.55	34.82	8.70	138.19	63.71
3	24.00	21	2.96E+07	1.02E-01	3.01E+03	3.98	1.38	1.97	1.82	7.86	7.25	0.134	0.535	14.96	3.74	58.78	27.11	35.91	8.98	141.06	65.06
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.521	15.35	3.84	59.78	27.58	36.84	9.21	143.48	66.20
5	27.00	23	2.96E+07	1.02E-01	3.24E+03	3.92	1.40	1.97	1.82	7.74	7.14	0.128	0.511	15.67	3.92	60.61	27.97	37.61	9.40	145.47	67.14
6	28.50	23	2.96E+07	1.02E-01	3.32E+03	3.90	1.41	1.97	1.82	7.69	7.10	0.125	0.502	15.94	3.99	61.32	28.31	38.26	9.57	147.16	67.93
7	30.00	24	2.96E+07	1.02E-01	3.40E+03	3.89	1.42	1.97	1.82	7.66	7.07	0.124	0.495	16.17	4.04	61.89	28.57	38.80	9.70	148.52	68.58

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-09)	-
Chainage	0-224	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	90.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-09)	1.00	22.00	19.50	16.50	136.94	72.80	10.36	2.59
BH-(-09)	1.00	23.50	21.00	18.00	145.95	80.75	10.75	2.69
BH-(-09)	1.00	25.00	22.50	19.50	154.96	88.71	11.14	2.79
BH-(-09)	1.00	26.50	24.00	21.00	163.97	96.67	11.48	2.87
BH-(-09)	1.00	28.00	25.50	22.50	172.98	104.63	11.76	2.94
BH-(-09)	1.00	29.50	27.00	24.00	181.99	112.58	12.00	3.00
BH-(-09)	1.00	30.00	27.50	24.50	184.99	115.23	12.20	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	4.61	9.22	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	13.82	18.43	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.74	0.04	22	-	4.00	7.59	1.00	-	6.25	7.00	24.24	30.05	4.71	4.40	19.19	23.59	9.43	8.93
4	7.00	8.50	1.50	Granular	7.74	0.04	22	-	4.00	7.59	1.00	-	7.75	8.50	35.85	41.66	4.71	6.51	26.13	37.04	14.82	12.40
5	8.50	10.00	1.50	Granular	7.74	0.03	24	-	8.00	9.78	1.00	-	9.25	10.00	47.47	53.28	4.71	9.40	43.52	63.83	25.53	16.68
6	10.00	11.50	1.50	Granular	7.74	0.03	24	-	8.00	9.78	1.00	-	10.75	11.50	59.08	64.89	4.71	11.70	52.47	84.49	33.80	21.61
7	11.50	13.00	1.50	Granular	8.69	0.02	26	-	11.90	13.19	1.00	-	12.25	13.00	71.41	77.93	4.71	15.33	85.11	132.46	52.98	27.55
8	13.00	14.50	1.50	Granular	8.69	0.02	26	-	11.90	13.19	1.00	-	13.75	14.50	84.45	90.97	4.71	18.12	98.67	164.14	65.66	34.27
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	90.97	90.97	4.71	21.03	134.06	220.55	88.22	41.81
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	90.97	90.97	4.71	21.03	134.06	241.58	96.63	49.35
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	90.97	90.97	4.71	21.78	151.40	280.69	112.28	57.09
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	90.97	90.97	4.71	21.78	151.40	302.47	120.99	64.84
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	90.97	90.97	4.71	22.53	168.74	342.34	136.94	72.80
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	90.97	90.97	4.71	22.53	168.74	364.86	145.95	80.75
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	90.97	90.97	4.71	22.53	168.74	387.39	154.96	88.71
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	90.97	90.97	4.71	22.53	168.74	409.92	163.97	96.67
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	90.97	90.97	4.71	22.53	168.74	432.45	172.98	104.63
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	90.97	90.97	4.71	22.53	168.74	454.97	181.99	112.58
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	90.97	90.97	1.57	7.51	168.74	462.48	184.99	115.23

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.08	16.72	24.87	6.22	86.59	40.14
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.744	10.75	2.69	36.97	17.15	25.80	6.45	88.74	41.15
3	24.00	20	2.96E+07	4.91E-02	2.86E+03	3.48	1.58	1.96	1.81	6.80	6.31	0.179	0.718	11.14	2.79	37.87	17.57	26.75	6.69	90.89	42.18
4	25.50	21	2.96E+07	4.91E-02	2.99E+03	3.44	1.60	1.95	1.81	6.73	6.25	0.174	0.697	11.48	2.87	38.63	17.93	27.55	6.89	92.71	43.04
5	27.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.68	6.20	0.170	0.680	11.76	2.94	39.25	18.23	28.22	7.06	94.21	43.75
6	28.50	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.667	12.00	3.00	39.79	18.48	28.80	7.20	95.49	44.35
7	30.00	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.63	1.95	1.81	6.59	6.13	0.164	0.656	12.20	3.05	40.22	18.69	29.28	7.32	96.54	44.85

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-09)	-
Chainage	0-224	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	121.55	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-09)	1.20	22.00	19.50	16.50	226.63	103.00	13.46	3.37
BH-(-09)	1.20	23.50	21.00	18.00	241.08	115.49	13.97	3.49
BH-(-09)	1.20	25.00	22.50	19.50	255.53	127.98	14.48	3.62
BH-(-09)	1.20	26.50	24.00	21.00	269.98	140.47	14.91	3.73
BH-(-09)	1.20	28.00	25.50	22.50	284.42	152.95	15.28	3.82
BH-(-09)	1.20	29.50	27.00	24.00	298.87	165.44	15.59	3.90
BH-(-09)	1.20	30.00	27.50	24.50	303.69	169.61	15.85	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	4.61	9.22	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	13.82	18.43	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.74	0.04	22	-	4.00	7.59	1.00	-	6.25	7.00	24.24	30.05	5.65	5.28	27.98	33.26	13.30	12.56
4	7.00	8.50	1.50	Granular	7.74	0.04	22	-	4.00	7.59	1.00	-	7.75	8.50	35.85	41.66	5.65	7.81	37.98	51.08	20.43	17.13
5	8.50	10.00	1.50	Granular	7.74	0.03	24	-	8.00	9.78	1.00	-	9.25	10.00	47.47	53.28	5.65	11.28	63.37	87.75	35.10	22.66
6	10.00	11.50	1.50	Granular	7.74	0.03	24	-	8.00	9.78	1.00	-	10.75	11.50	59.08	64.89	5.65	14.05	76.27	114.69	45.88	28.97
7	11.50	13.00	1.50	Granular	8.69	0.02	26	-	11.90	13.19	1.00	-	12.25	13.00	71.41	77.93	5.65	18.39	123.73	180.55	72.22	36.49
8	13.00	14.50	1.50	Granular	8.69	0.02	26	-	11.90	13.19	1.00	-	13.75	14.50	84.45	90.97	5.65	21.75	143.26	221.82	88.73	44.96
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	98.62	106.26	5.65	27.35	225.78	331.69	132.68	54.99
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	113.91	121.55	5.65	31.59	256.70	394.20	157.68	66.21
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	121.55	121.55	5.65	34.92	289.91	462.33	184.93	78.36
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	121.55	121.55	5.65	34.92	289.91	497.25	198.90	90.51
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	121.55	121.55	5.65	36.12	323.13	566.58	226.63	103.00
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	121.55	121.55	5.65	36.12	323.13	602.70	241.08	115.49
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	121.55	121.55	5.65	36.12	323.13	638.82	255.53	127.98
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	121.55	121.55	5.65	36.12	323.13	674.94	269.98	140.47
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	121.55	121.55	5.65	36.12	323.13	711.06	284.42	152.95
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	121.55	121.55	5.65	36.12	323.13	747.18	298.87	165.44
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	121.55	121.55	1.88	12.04	323.13	759.22	303.69	169.61

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.37	54.78	25.23	32.31	8.08	131.46	60.55
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.573	13.97	3.49	56.13	25.86	33.52	8.38	134.72	62.08
3	24.00	20	2.96E+07	1.02E-01	2.86E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.553	14.48	3.62	57.50	26.51	34.75	8.69	137.99	63.62
4	25.50	21	2.96E+07	1.02E-01	2.99E+03	3.99	1.38	1.97	1.82	7.86	7.25	0.134	0.536	14.91	3.73	58.65	27.05	35.79	8.95	140.75	64.91
5	27.00	22	2.96E+07	1.02E-01	3.11E+03	3.96	1.39	1.97	1.82	7.80	7.20	0.131	0.524	15.28	3.82	59.59	27.49	36.66	9.17	143.03	65.99
6	28.50	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.59	3.90	60.40	27.88	37.41	9.35	144.97	66.90
7	30.00	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.505	15.85	3.96	61.07	28.19	38.03	9.51	146.57	67.65

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-10)	-
Chainage	0-372	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	90.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-10)	1.00	22.00	19.50	15.00	136.76	72.68	11.22	2.80
BH-(-10)	1.00	23.50	21.00	16.50	145.77	80.63	11.49	2.87
BH-(-10)	1.00	25.00	22.50	18.00	154.78	88.59	11.87	2.97
BH-(-10)	1.00	26.50	24.00	19.50	163.79	96.55	12.19	3.05
BH-(-10)	1.00	28.00	25.50	21.00	172.80	104.50	12.45	3.11
BH-(-10)	1.00	29.50	27.00	22.50	181.81	112.46	12.67	3.17
BH-(-10)	1.00	30.00	27.50	23.00	184.82	115.11	12.86	3.21

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	4.61	9.22	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	13.82	18.43	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.74	0.02	23	-	6.00	8.68	1.00	-	6.25	7.00	24.24	30.05	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.74	0.02	23	-	6.00	8.68	1.00	-	7.75	8.50	35.85	41.66	4.71	6.81	30.35	37.15	14.86	11.25
5	8.50	10.00	1.50	Granular	7.74	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	47.47	53.28	4.71	9.80	48.74	65.34	26.14	15.64
6	10.00	11.50	1.50	Granular	7.74	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	59.08	64.89	4.71	12.19	58.70	87.49	35.00	20.71
7	11.50	13.00	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	71.41	77.93	4.71	15.91	99.96	144.67	57.87	26.81
8	13.00	14.50	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	84.45	90.97	4.71	18.82	115.90	179.43	71.77	33.73
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	90.97	90.97	4.71	21.03	134.06	218.61	87.44	41.27
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	90.97	90.97	4.71	21.03	134.06	239.64	95.85	48.80
11	17.50	19.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	90.97	90.97	4.71	22.53	168.74	296.85	118.74	56.76
12	19.00	20.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	90.97	90.97	4.71	22.53	168.74	319.37	127.75	64.72
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	90.97	90.97	4.71	22.53	168.74	341.90	136.76	72.68
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	90.97	90.97	4.71	22.53	168.74	364.43	145.77	80.63
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	90.97	90.97	4.71	22.53	168.74	386.95	154.78	88.59
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	90.97	90.97	4.71	22.53	168.74	409.48	163.79	96.55
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	90.97	90.97	4.71	22.53	168.74	432.01	172.80	104.50
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	90.97	90.97	4.71	22.53	168.74	454.53	181.81	112.46
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	90.97	90.97	1.57	7.51	168.74	462.04	184.82	115.11

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.68E+03	3.52	1.99	1.93	1.80	6.78	6.35	0.178	0.713	11.22	2.80	38.04	17.82	26.92	6.73	91.29	42.77
2	22.50	20	2.96E+07	4.91E-02	2.78E+03	3.50	2.00	1.92	1.80	6.73	6.31	0.174	0.696	11.49	2.87	38.65	18.11	27.58	6.89	92.76	43.48
3	24.00	21	2.96E+07	4.91E-02	2.93E+03	3.46	2.02	1.92	1.80	6.66	6.24	0.169	0.674	11.87	2.97	39.49	18.52	28.48	7.12	94.78	44.44
4	25.50	21	2.96E+07	4.91E-02	3.05E+03	3.43	2.04	1.92	1.80	6.60	6.19	0.164	0.657	12.19	3.05	40.20	18.85	29.25	7.31	96.47	45.25
5	27.00	22	2.96E+07	4.91E-02	3.16E+03	3.41	2.05	1.92	1.80	6.55	6.15	0.161	0.643	12.45	3.11	40.77	19.13	29.88	7.47	97.86	45.91
6	28.50	23	2.96E+07	4.91E-02	3.25E+03	3.39	2.07	1.92	1.80	6.51	6.11	0.158	0.631	12.67	3.17	41.26	19.36	30.42	7.60	99.03	46.47
7	30.00	23	2.96E+07	4.91E-02	3.32E+03	3.37	2.07	1.92	1.80	6.48	6.08	0.156	0.622	12.86	3.21	41.66	19.55	30.85	7.71	99.98	46.92

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-(-10)	-
Chainage	0-372	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	121.55	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-(-10)	1.20	22.00	19.50	15.00	226.67	103.02	14.59	3.65
BH-(-10)	1.20	23.50	21.00	16.50	241.11	115.51	14.95	3.74
BH-(-10)	1.20	25.00	22.50	18.00	255.56	128.00	15.44	3.86
BH-(-10)	1.20	26.50	24.00	19.50	270.01	140.49	15.86	3.96
BH-(-10)	1.20	28.00	25.50	21.00	284.46	152.98	16.20	4.05
BH-(-10)	1.20	29.50	27.00	22.50	298.90	165.47	16.50	4.12
BH-(-10)	1.20	30.00	27.50	23.00	303.72	169.63	16.73	4.18

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	3.25	4.00	4.61	9.22	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.14	0.04	22	-	4.00	7.59	1.00	-	4.75	5.50	13.82	18.43	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.74	0.02	23	-	6.00	8.68	1.00	-	6.25	7.00	24.24	30.05	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.74	0.02	23	-	6.00	8.68	1.00	-	7.75	8.50	35.85	41.66	5.65	8.17	44.23	52.40	20.96	15.75
5	8.50	10.00	1.50	Granular	7.74	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	47.47	53.28	5.65	11.75	71.06	90.99	36.39	21.41
6	10.00	11.50	1.50	Granular	7.74	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	59.08	64.89	5.65	14.63	85.41	119.96	47.98	27.88
7	11.50	13.00	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	71.41	77.93	5.65	19.10	145.31	198.96	79.58	35.61
8	13.00	14.50	1.50	Granular	8.69	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	84.45	90.97	5.65	22.59	168.26	244.49	97.80	44.30
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	98.62	106.26	5.65	27.35	225.78	329.36	131.75	54.34
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	113.91	121.55	5.65	31.59	256.70	391.87	156.75	65.56
11	17.50	19.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	121.55	121.55	5.65	36.12	323.13	494.43	197.77	78.05
12	19.00	20.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	121.55	121.55	5.65	36.12	323.13	530.55	212.22	90.54
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	121.55	121.55	5.65	36.12	323.13	566.66	226.67	103.02
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	121.55	121.55	5.65	36.12	323.13	602.78	241.11	115.51
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	121.55	121.55	5.65	36.12	323.13	638.90	255.56	128.00
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	121.55	121.55	5.65	36.12	323.13	675.02	270.01	140.49
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	121.55	121.55	5.65	36.12	323.13	711.14	284.46	152.98
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	121.55	121.55	5.65	36.12	323.13	747.26	298.90	165.47
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	121.55	121.55	1.88	12.04	323.13	759.30	303.72	169.63

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.68E+03	4.07	1.72	1.94	1.81	7.92	7.38	0.137	0.548	14.59	3.65	57.80	26.92	35.02	8.76	138.72	64.60
2	22.50	20	2.96E+07	1.02E-01	2.78E+03	4.04	1.73	1.94	1.81	7.86	7.32	0.134	0.535	14.95	3.74	58.74	27.36	35.88	8.97	140.97	65.67
3	24.00	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.75	1.94	1.81	7.77	7.25	0.130	0.518	15.44	3.86	60.02	27.97	37.05	9.26	144.04	67.13
4	25.50	21	2.96E+07	1.02E-01	3.05E+03	3.97	1.76	1.94	1.81	7.71	7.19	0.126	0.505	15.86	3.96	61.09	28.48	38.06	9.51	146.62	68.36
5	27.00	22	2.96E+07	1.02E-01	3.16E+03	3.94	1.77	1.94	1.81	7.65	7.14	0.123	0.494	16.20	4.05	61.98	28.90	38.88	9.72	148.74	69.37
6	28.50	23	2.96E+07	1.02E-01	3.25E+03	3.92	1.78	1.94	1.81	7.60	7.09	0.121	0.485	16.50	4.12	62.72	29.26	39.59	9.90	150.54	70.22
7	30.00	23	2.96E+07	1.02E-01	3.32E+03	3.90	1.79	1.94	1.81	7.57	7.06	0.120	0.478	16.73	4.18	63.32	29.54	40.16	10.04	151.98	70.91

A.2. Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-01	1.00	22.00	19.50	19.50	332.41	152.02	10.76	2.69	165.60	86.25	10.76	2.69
BH-01	1.00	23.50	21.00	21.00	352.94	168.04	10.86	2.72	175.94	95.14	10.86	2.72
BH-01	1.00	25.00	22.50	22.50	373.48	184.07	11.07	2.77	186.27	104.02	11.07	2.77
BH-01	1.00	26.50	24.00	24.00	394.01	200.09	11.25	2.81	196.60	112.90	11.25	2.81
BH-01	1.00	28.00	25.50	25.50	414.54	216.11	11.39	2.85	206.94	121.78	11.39	2.85
BH-01	1.00	29.50	27.00	27.00	435.07	232.13	11.51	2.88	217.27	130.67	11.51	2.88
BH-01	1.00	30.00	27.50	27.50	441.92	237.47	11.60	2.90	220.71	133.63	11.60	2.90
BH-01	1.20	22.00	19.50	19.50	476.85	197.34	14.08	3.52	259.20	118.41	14.08	3.52
BH-01	1.20	23.50	21.00	21.00	504.77	219.25	14.22	3.55	274.87	131.76	14.22	3.55
BH-01	1.20	25.00	22.50	22.50	532.68	241.17	14.49	3.62	290.55	145.11	14.49	3.62
BH-01	1.20	26.50	24.00	24.00	560.60	263.09	14.72	3.68	306.23	158.46	14.72	3.68
BH-01	1.20	28.00	25.50	25.50	588.52	285.00	14.90	3.73	321.91	171.81	14.90	3.73
BH-01	1.20	29.50	27.00	27.00	616.43	306.92	15.06	3.77	337.59	185.16	15.06	3.77
BH-01	1.20	30.00	27.50	27.50	682.15	314.44	15.18	3.80	375.16	189.73	15.18	3.80
BH-02	1.00	22.00	19.50	15.00	309.00	135.96	10.79	2.70	134.48	72.08	10.79	2.70
BH-02	1.00	23.50	21.00	16.50	329.49	151.95	11.11	2.78	143.31	79.91	11.11	2.78
BH-02	1.00	25.00	22.50	18.00	350.13	167.94	11.51	2.88	152.30	87.74	11.51	2.88
BH-02	1.00	26.50	24.00	19.50	370.62	183.93	11.86	2.96	161.13	95.57	11.86	2.96
BH-02	1.00	28.00	25.50	21.00	391.11	199.92	12.14	3.04	169.96	103.40	12.14	3.04

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-02	1.00	29.50	27.00	22.50	411.59	215.92	12.39	3.10	178.79	111.24	12.39	3.10
BH-02	1.00	30.00	27.50	23.00	418.42	221.25	12.58	3.15	181.74	113.85	12.58	3.15
BH-02	1.20	22.00	19.50	15.00	448.99	177.91	14.04	3.51	219.59	101.25	14.04	3.51
BH-02	1.20	23.50	21.00	16.50	476.93	199.84	14.45	3.61	233.54	113.39	14.45	3.61
BH-02	1.20	25.00	22.50	18.00	505.13	221.77	14.98	3.74	247.75	125.53	14.98	3.74
BH-02	1.20	26.50	24.00	19.50	533.07	243.70	15.43	3.86	261.70	137.67	15.43	3.86
BH-02	1.20	28.00	25.50	21.00	561.00	265.63	15.80	3.95	275.65	149.81	15.80	3.95
BH-02	1.20	29.50	27.00	22.50	588.94	287.56	16.12	4.03	289.60	161.95	16.12	4.03
BH-02	1.20	30.00	27.50	23.00	598.25	294.87	16.38	4.09	294.25	165.99	16.38	4.09
BH-03	1.00	22.00	19.50	16.50	310.86	139.91	10.55	2.64	150.56	78.69	10.55	2.64
BH-03	1.00	23.50	21.00	18.00	330.79	155.51	11.01	2.75	160.30	87.16	11.01	2.75
BH-03	1.00	25.00	22.50	19.50	350.73	171.12	11.38	2.84	170.03	95.63	11.38	2.84
BH-03	1.00	26.50	24.00	21.00	370.67	186.72	11.70	2.92	179.77	104.09	11.70	2.92
BH-03	1.00	28.00	25.50	22.50	390.61	202.33	11.96	2.99	189.51	112.56	11.96	2.99
BH-03	1.00	29.50	27.00	24.00	410.55	217.94	12.19	3.05	199.25	121.03	12.19	3.05
BH-03	1.00	30.00	27.50	24.50	417.19	223.14	12.38	3.09	202.50	123.85	12.38	3.09
BH-03	1.20	22.00	19.50	16.50	454.44	183.79	13.71	3.43	244.59	110.33	13.71	3.43
BH-03	1.20	23.50	21.00	18.00	482.00	205.45	14.30	3.57	259.91	123.43	14.30	3.57
BH-03	1.20	25.00	22.50	19.50	509.56	227.12	14.78	3.70	275.23	136.53	14.78	3.70
BH-03	1.20	26.50	24.00	21.00	537.12	248.79	15.20	3.80	290.56	149.63	15.20	3.80
BH-03	1.20	28.00	25.50	22.50	564.68	270.45	15.54	3.88	305.88	162.73	15.54	3.88
BH-03	1.20	29.50	27.00	24.00	592.24	292.12	15.83	3.96	321.20	175.83	15.83	3.96
BH-03	1.20	30.00	27.50	24.50	601.42	299.34	16.08	4.02	326.31	180.20	16.08	4.02
BH-04	1.00	22.00	19.50	16.50	301.37	136.24	10.85	2.71	141.46	75.29	10.85	2.71
BH-04	1.00	23.50	21.00	18.00	320.71	151.43	11.28	2.82	150.60	83.34	11.28	2.82

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-04	1.00	25.00	22.50	19.50	340.06	166.62	11.64	2.91	159.75	91.40	11.64	2.91
BH-04	1.00	26.50	24.00	21.00	359.40	181.81	11.94	2.98	168.89	99.45	11.94	2.98
BH-04	1.00	28.00	25.50	22.50	378.74	197.00	12.19	3.05	178.03	107.50	12.19	3.05
BH-04	1.00	29.50	27.00	24.00	398.09	212.18	12.40	3.10	187.18	115.55	12.40	3.10
BH-04	1.00	30.00	27.50	24.50	404.53	217.25	12.58	3.14	190.23	118.23	12.58	3.14
BH-04	1.20	22.00	19.50	16.50	439.56	178.72	14.10	3.52	230.19	105.60	14.10	3.52
BH-04	1.20	23.50	21.00	18.00	466.23	199.77	14.66	3.66	244.62	118.07	14.66	3.66
BH-04	1.20	25.00	22.50	19.50	492.90	220.81	15.12	3.78	259.05	130.55	15.12	3.78
BH-04	1.20	26.50	24.00	21.00	519.57	241.85	15.51	3.88	273.48	143.02	15.51	3.88
BH-04	1.20	28.00	25.50	22.50	546.24	262.90	15.83	3.96	287.91	155.50	15.83	3.96
BH-04	1.20	29.50	27.00	24.00	572.91	283.94	16.11	4.03	302.34	167.97	16.11	4.03
BH-04	1.20	30.00	27.50	24.50	581.80	290.96	16.34	4.09	307.15	172.13	16.34	4.09
BH-05	1.00	22.00	19.50	15.00	281.10	126.36	11.52	2.88	145.73	75.32	11.52	2.88
BH-05	1.00	23.50	21.00	16.50	299.58	140.95	11.87	2.97	155.47	83.78	11.87	2.97
BH-05	1.00	25.00	22.50	18.00	318.07	155.54	12.24	3.06	165.21	92.25	12.24	3.06
BH-05	1.00	26.50	24.00	19.50	336.55	170.12	12.56	3.14	174.95	100.72	12.56	3.14
BH-05	1.00	28.00	25.50	21.00	355.03	184.71	12.82	3.21	184.69	109.18	12.82	3.21
BH-05	1.00	29.50	27.00	22.50	373.51	199.29	13.05	3.26	194.43	117.65	13.05	3.26
BH-05	1.00	30.00	27.50	23.00	379.67	204.16	13.23	3.31	197.67	120.47	13.23	3.31
BH-05	1.20	22.00	19.50	15.00	410.56	165.92	14.99	3.75	233.13	104.66	14.99	3.75
BH-05	1.20	23.50	21.00	16.50	435.98	186.09	15.44	3.86	248.06	117.48	15.44	3.86
BH-05	1.20	25.00	22.50	18.00	461.40	206.25	15.93	3.98	262.99	130.31	15.93	3.98
BH-05	1.20	26.50	24.00	19.50	486.82	226.42	16.34	4.09	277.92	143.14	16.34	4.09
BH-05	1.20	28.00	25.50	21.00	512.24	246.59	16.69	4.17	292.84	155.96	16.69	4.17
BH-05	1.20	29.50	27.00	22.50	537.66	266.76	16.98	4.25	307.77	168.79	16.98	4.25

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-05	1.20	30.00	27.50	23.00	546.13	273.48	17.23	4.31	312.75	173.06	17.23	4.31
BH-06	1.00	22.00	19.50	16.50	318.38	143.69	10.59	2.65	156.48	81.35	10.59	2.65
BH-06	1.00	23.50	21.00	18.00	338.62	159.50	10.85	2.71	166.52	90.03	10.85	2.71
BH-06	1.00	25.00	22.50	19.50	358.85	175.32	11.10	2.77	176.55	98.70	11.10	2.77
BH-06	1.00	26.50	24.00	21.00	379.09	191.13	11.44	2.86	186.59	107.38	11.44	2.86
BH-06	1.00	28.00	25.50	22.50	399.33	206.95	11.72	2.93	196.63	116.05	11.72	2.93
BH-06	1.00	29.50	27.00	24.00	419.56	222.76	11.96	2.99	206.66	124.73	11.96	2.99
BH-06	1.00	30.00	27.50	24.50	426.31	228.03	12.16	3.04	210.01	127.62	12.16	3.04
BH-06	1.20	22.00	19.50	16.50	459.18	187.11	13.76	3.44	247.41	112.30	13.76	3.44
BH-06	1.20	23.50	21.00	18.00	486.74	208.77	14.10	3.53	262.73	125.40	14.10	3.53
BH-06	1.20	25.00	22.50	19.50	514.30	230.44	14.42	3.60	278.06	138.50	14.42	3.60
BH-06	1.20	26.50	24.00	21.00	541.86	252.11	14.86	3.71	293.38	151.60	14.86	3.71
BH-06	1.20	28.00	25.50	22.50	569.42	273.78	15.22	3.80	308.70	164.70	15.22	3.80
BH-06	1.20	29.50	27.00	24.00	596.98	295.44	15.53	3.88	324.02	177.80	15.53	3.88
BH-06	1.20	30.00	27.50	24.50	606.17	302.67	15.79	3.95	329.13	182.17	15.79	3.95
BH-07	1.00	22.00	19.50	19.50	299.69	139.38	10.85	2.71	154.39	81.38	10.85	2.71
BH-07	1.00	23.50	21.00	21.00	318.17	153.96	11.10	2.78	164.13	89.84	11.10	2.78
BH-07	1.00	25.00	22.50	22.50	336.65	168.55	11.31	2.83	173.87	98.31	11.31	2.83
BH-07	1.00	26.50	24.00	24.00	355.13	183.13	11.48	2.87	183.61	106.77	11.48	2.87
BH-07	1.00	28.00	25.50	25.50	373.62	197.72	11.62	2.91	193.34	115.24	11.62	2.91
BH-07	1.00	29.50	27.00	27.00	392.10	212.31	11.74	2.94	203.08	123.71	11.74	2.94
BH-07	1.00	30.00	27.50	27.50	398.26	217.17	11.84	2.96	206.33	126.53	11.84	2.96
BH-07	1.20	22.00	19.50	19.50	433.73	182.14	14.20	3.55	244.38	112.54	14.20	3.55
BH-07	1.20	23.50	21.00	21.00	459.15	202.30	14.53	3.63	259.31	125.36	14.53	3.63
BH-07	1.20	25.00	22.50	22.50	484.57	222.47	14.80	3.70	274.24	138.19	14.80	3.70

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-07	1.20	26.50	24.00	24.00	509.99	242.64	15.03	3.76	289.17	151.01	15.03	3.76
BH-07	1.20	28.00	25.50	25.50	535.41	262.81	15.21	3.80	304.10	163.84	15.21	3.80
BH-07	1.20	29.50	27.00	27.00	560.83	282.98	15.37	3.84	319.03	176.66	15.37	3.84
BH-07	1.20	30.00	27.50	27.50	569.30	289.70	15.49	3.87	324.00	180.94	15.49	3.87
BH-08	1.00	22.00	19.50	16.50	312.07	140.76	11.22	2.81	151.12	79.08	11.22	2.81
BH-08	1.00	23.50	21.00	18.00	332.01	156.36	11.62	2.91	160.85	87.55	11.62	2.91
BH-08	1.00	25.00	22.50	19.50	351.95	171.97	11.95	2.99	170.59	96.02	11.95	2.99
BH-08	1.00	26.50	24.00	21.00	371.88	187.57	12.23	3.06	180.33	104.48	12.23	3.06
BH-08	1.00	28.00	25.50	22.50	391.82	203.18	12.46	3.11	190.07	112.95	12.46	3.11
BH-08	1.00	29.50	27.00	24.00	411.76	218.79	12.65	3.16	199.81	121.42	12.65	3.16
BH-08	1.00	30.00	27.50	24.50	418.41	223.99	12.81	3.20	203.06	124.24	12.81	3.20
BH-08	1.20	22.00	19.50	16.50	455.89	184.80	14.58	3.65	245.26	110.80	14.58	3.65
BH-08	1.20	23.50	21.00	18.00	483.45	206.47	15.10	3.77	260.58	123.90	15.10	3.77
BH-08	1.20	25.00	22.50	19.50	511.01	228.14	15.52	3.88	275.90	137.00	15.52	3.88
BH-08	1.20	26.50	24.00	21.00	538.57	249.81	15.88	3.97	291.23	150.10	15.88	3.97
BH-08	1.20	28.00	25.50	22.50	566.13	271.47	16.18	4.05	306.55	163.20	16.18	4.05
BH-08	1.20	29.50	27.00	24.00	593.69	293.14	16.44	4.11	321.87	176.30	16.44	4.11
BH-08	1.20	30.00	27.50	24.50	602.88	300.36	16.64	4.16	326.98	180.67	16.64	4.16
BH-09	1.00	22.00	19.50	18.00	316.95	144.17	11.10	2.77	153.20	80.55	11.10	2.77
BH-09	1.00	23.50	21.00	19.50	336.89	159.78	11.43	2.86	162.94	89.01	11.43	2.86
BH-09	1.00	25.00	22.50	21.00	356.83	175.38	11.69	2.92	172.68	97.48	11.69	2.92
BH-09	1.00	26.50	24.00	22.50	376.77	190.99	11.92	2.98	182.42	105.94	11.92	2.98
BH-09	1.00	28.00	25.50	24.00	396.70	206.60	12.10	3.03	192.16	114.41	12.10	3.03
BH-09	1.00	29.50	27.00	25.50	416.64	222.20	12.26	3.07	201.90	122.88	12.26	3.07
BH-09	1.00	30.00	27.50	26.00	423.29	227.40	12.39	3.10	205.14	125.70	12.39	3.10

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-09	1.20	22.00	19.50	18.00	461.75	188.90	14.44	3.61	247.77	112.55	14.44	3.61
BH-09	1.20	23.50	21.00	19.50	489.31	210.57	14.87	3.72	263.09	125.65	14.87	3.72
BH-09	1.20	25.00	22.50	21.00	516.87	232.24	15.21	3.80	278.41	138.75	15.21	3.80
BH-09	1.20	26.50	24.00	22.50	544.43	253.91	15.51	3.88	293.73	151.85	15.51	3.88
BH-09	1.20	28.00	25.50	24.00	571.99	275.57	15.75	3.94	309.05	164.95	15.75	3.94
BH-09	1.20	29.50	27.00	25.50	599.55	297.24	15.95	3.99	324.37	178.05	15.95	3.99
BH-09	1.20	30.00	27.50	26.00	608.74	304.46	16.12	4.03	329.48	182.42	16.12	4.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-01	-
Chainage	0+571	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	207.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-01	1.00	22.00	19.50	19.50	332.41	152.02	10.76	2.69
BH-01	1.00	23.50	21.00	21.00	352.94	168.04	10.86	2.72
BH-01	1.00	25.00	22.50	22.50	373.48	184.07	11.07	2.77
BH-01	1.00	26.50	24.00	24.00	394.01	200.09	11.25	2.81
BH-01	1.00	28.00	25.50	25.50	414.54	216.11	11.39	2.85
BH-01	1.00	29.50	27.00	27.00	435.07	232.13	11.51	2.88
BH-01	1.00	30.00	27.50	27.50	441.92	237.47	11.60	2.90

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	4.71	2.53	25.02	27.55	11.02	5.11
2	4.00	5.50	1.50	Granular	17.00	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	4.71	7.58	44.68	54.79	21.91	8.88
3	5.50	7.00	1.50	Granular	19.00	0.01	27	-	13.80	15.50	1.00	-	6.25	7.00	65.25	79.50	4.71	14.54	107.49	132.13	52.85	14.60
4	7.00	8.50	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	7.75	8.50	93.75	108.00	4.71	22.44	184.53	231.61	92.64	22.53
5	8.50	10.00	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	122.25	136.50	4.71	29.26	229.74	306.09	122.44	32.37
6	10.00	11.50	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	150.75	165.00	4.71	36.09	274.96	387.39	154.96	44.13
7	11.50	13.00	1.50	Granular	19.00	0.02	29	-	17.60	20.13	1.00	-	12.25	13.00	179.25	193.50	4.71	42.91	320.17	475.52	190.21	57.79
8	13.00	14.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	13.75	14.50	200.40	207.29	4.71	47.97	335.25	538.56	215.43	72.87
9	14.50	16.00	1.50	Granular	9.19	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	207.29	207.29	4.71	49.62	335.25	588.18	235.27	88.41
10	16.00	17.50	1.50	Granular	9.19	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	207.29	207.29	4.71	49.62	335.25	637.80	255.12	103.96
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	207.29	207.29	4.71	51.33	374.48	728.37	291.35	119.98
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	207.29	207.29	4.71	51.33	374.48	779.70	311.88	136.00
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	207.29	207.29	4.71	51.33	374.48	831.03	332.41	152.02
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	207.29	207.29	4.71	51.33	374.48	882.36	352.94	168.04
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	207.29	207.29	4.71	51.33	374.48	933.69	373.48	184.07
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	207.29	207.29	4.71	51.33	374.48	985.02	394.01	200.09
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	207.29	207.29	4.71	51.33	374.48	1036.35	414.54	216.11
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	207.29	207.29	4.71	51.33	374.48	1087.68	435.07	232.13
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	207.29	207.29	1.57	17.11	374.48	1104.79	441.92	237.47

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.43E+03	3.35	0.75	2.05	1.84	6.88	6.18	0.186	0.743	10.76	2.69	37.00	16.64	25.82	6.46	88.79	39.93
2	22.50	24	2.96E+07	4.91E-02	3.48E+03	3.34	0.75	2.05	1.84	6.85	6.17	0.184	0.736	10.86	2.72	37.23	16.75	26.07	6.52	89.36	40.19
3	24.00	25	2.96E+07	4.91E-02	3.58E+03	3.32	0.75	2.05	1.84	6.81	6.13	0.181	0.723	11.07	2.77	37.71	16.96	26.57	6.64	90.50	40.71
4	25.50	26	2.96E+07	4.91E-02	3.67E+03	3.31	0.76	2.05	1.84	6.78	6.10	0.178	0.711	11.25	2.81	38.10	17.14	26.99	6.75	91.45	41.14
5	27.00	26	2.96E+07	4.91E-02	3.75E+03	3.29	0.76	2.05	1.84	6.75	6.07	0.176	0.702	11.39	2.85	38.43	17.29	27.34	6.83	92.22	41.50
6	28.50	27	2.96E+07	4.91E-02	3.81E+03	3.28	0.76	2.05	1.84	6.72	6.05	0.174	0.695	11.51	2.88	38.70	17.41	27.63	6.91	92.87	41.80
7	30.00	27	2.96E+07	4.91E-02	3.86E+03	3.27	0.76	2.05	1.84	6.71	6.04	0.172	0.689	11.60	2.90	38.91	17.51	27.85	6.96	93.38	42.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-01	-
Chainage	0+571	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	234.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-01	1.20	22.00	19.50	19.50	476.85	197.34	14.08	3.52
BH-01	1.20	23.50	21.00	21.00	504.77	219.25	14.22	3.55
BH-01	1.20	25.00	22.50	22.50	532.68	241.17	14.49	3.62
BH-01	1.20	26.50	24.00	24.00	560.60	263.09	14.72	3.68
BH-01	1.20	28.00	25.50	25.50	588.52	285.00	14.90	3.73
BH-01	1.20	29.50	27.00	27.00	616.43	306.92	15.06	3.77
BH-01	1.20	30.00	27.50	27.50	682.15	314.44	15.18	3.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	5.65	3.03	37.57	40.61	16.24	7.18
2	4.00	5.50	1.50	Granular	17.00	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	5.65	9.09	65.89	78.01	31.20	12.10
3	5.50	7.00	1.50	Granular	19.00	0.01	27	-	13.80	15.50	1.00	-	6.25	7.00	65.25	79.50	5.65	17.45	157.76	187.33	74.93	19.36
4	7.00	8.50	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	7.75	8.50	93.75	108.00	5.65	26.93	269.51	326.02	130.41	29.28
5	8.50	10.00	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	122.25	136.50	5.65	35.12	334.62	426.24	170.50	41.49
6	10.00	11.50	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	150.75	165.00	5.65	43.30	399.74	534.66	213.86	55.99
7	11.50	13.00	1.50	Granular	19.00	0.02	29	-	17.60	20.13	1.00	-	12.25	13.00	179.25	193.50	5.65	51.49	464.85	651.26	260.50	72.78
8	13.00	14.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	13.75	14.50	200.40	207.29	5.65	57.56	484.60	728.57	291.43	91.27
9	14.50	16.00	1.50	Granular	9.19	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	214.19	221.08	5.65	61.52	516.10	821.60	328.64	110.87
10	16.00	17.50	1.50	Granular	9.19	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	227.98	234.87	5.65	65.49	547.61	918.59	367.44	131.58
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	234.87	234.87	5.65	69.79	611.76	1052.54	421.02	153.50
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	234.87	234.87	5.65	69.79	611.76	1122.33	448.93	175.42
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	234.87	234.87	5.65	69.79	611.76	1192.12	476.85	197.34
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	234.87	234.87	5.65	69.79	611.76	1261.92	504.77	219.25
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	234.87	234.87	5.65	69.79	611.76	1331.71	532.68	241.17
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	234.87	234.87	5.65	69.79	611.76	1401.50	560.60	263.09
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	234.87	234.87	5.65	69.79	611.76	1471.29	588.52	285.00
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	234.87	234.87	5.65	69.79	611.76	1541.09	616.43	306.92
19	29.50	30.00	0.50	Granular	10.19	0.00	31	-	25.00	27.56	1.00	-	29.75	30.00	234.87	234.87	1.88	24.04	752.02	1705.38	682.15	314.44

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.43E+03	3.88	0.64	2.07	1.85	8.02	7.17	0.142	0.568	14.08	3.52	56.45	25.26	33.80	8.45	135.48	60.62
2	22.50	24	2.96E+07	1.02E-01	3.48E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.563	14.22	3.55	56.81	25.42	34.13	8.53	136.35	61.02
3	24.00	25	2.96E+07	1.02E-01	3.58E+03	3.84	0.65	2.07	1.85	7.94	7.11	0.138	0.552	14.49	3.62	57.53	25.75	34.78	8.69	138.07	61.80
4	25.50	26	2.96E+07	1.02E-01	3.67E+03	3.83	0.65	2.06	1.85	7.90	7.07	0.136	0.544	14.72	3.68	58.13	26.02	35.33	8.83	139.52	62.46
5	27.00	26	2.96E+07	1.02E-01	3.75E+03	3.81	0.66	2.06	1.85	7.87	7.04	0.134	0.537	14.90	3.73	58.62	26.25	35.77	8.94	140.70	62.99
6	28.50	27	2.96E+07	1.02E-01	3.81E+03	3.80	0.66	2.06	1.85	7.84	7.02	0.133	0.531	15.06	3.77	59.03	26.43	36.15	9.04	141.68	63.44
7	30.00	27	2.96E+07	1.02E-01	3.86E+03	3.79	0.66	2.06	1.85	7.82	7.00	0.132	0.527	15.18	3.80	59.35	26.58	36.44	9.11	142.45	63.79

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-02	-
Chainage	0+674	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	206.85	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	14.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-02	1.00	22.00	19.50	15.00	309.00	135.96	10.79	2.70
BH-02	1.00	23.50	21.00	16.50	329.49	151.95	11.11	2.78
BH-02	1.00	25.00	22.50	18.00	350.13	167.94	11.51	2.88
BH-02	1.00	26.50	24.00	19.50	370.62	183.93	11.86	2.96
BH-02	1.00	28.00	25.50	21.00	391.11	199.92	12.14	3.04
BH-02	1.00	29.50	27.00	22.50	411.59	215.92	12.39	3.10
BH-02	1.00	30.00	27.50	23.00	418.42	221.25	12.58	3.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.00	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.00	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.00	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.25	102.00	4.71	19.15	114.04	133.19	53.28	14.71
5	8.50	10.00	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	114.75	127.50	4.71	24.63	140.55	184.33	73.73	23.25
6	10.00	11.50	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	140.25	153.00	4.71	30.10	167.07	240.95	96.38	33.33
7	11.50	13.00	1.50	Granular	17.00	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	165.75	178.50	4.71	38.31	261.19	373.37	149.35	45.71
8	13.00	14.50	1.50	Granular	18.90	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	192.68	206.85	4.71	44.53	302.17	458.89	183.56	59.82
9	14.50	16.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	15.25	16.00	206.85	206.85	4.71	46.10	257.73	460.55	184.22	74.38
10	16.00	17.50	1.50	Granular	9.69	0.09	27	-	13.80	15.50	1.00	-	16.75	17.50	206.85	206.85	4.71	46.10	258.06	506.97	202.79	88.94
11	17.50	19.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	206.85	206.85	4.71	49.51	334.90	633.33	253.33	104.45
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	206.85	206.85	4.71	49.51	334.90	682.85	273.14	119.97
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	206.85	206.85	4.71	51.22	373.32	772.49	309.00	135.96
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	206.85	206.85	4.71	51.22	373.32	823.71	329.49	151.95
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	206.85	206.85	4.71	51.22	373.71	875.32	350.13	167.94
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	206.85	206.85	4.71	51.22	373.71	926.54	370.62	183.93
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	206.85	206.85	4.71	51.22	373.71	977.76	391.11	199.92
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	206.85	206.85	4.71	51.22	373.71	1028.98	411.59	215.92
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	206.85	206.85	1.57	17.07	373.71	1046.06	418.42	221.25

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.52E+03	3.56	1.96	1.93	1.80	6.87	6.43	0.185	0.741	10.79	2.70	37.07	17.36	25.91	6.48	88.98	41.67
2	22.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.98	1.93	1.80	6.80	6.38	0.180	0.720	11.11	2.78	37.78	17.70	26.65	6.66	90.68	42.48
3	24.00	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.174	0.695	11.51	2.88	38.70	18.14	27.63	6.91	92.88	43.53
4	25.50	21	2.96E+07	4.91E-02	2.92E+03	3.46	2.02	1.92	1.80	6.66	6.24	0.169	0.675	11.86	2.96	39.47	18.50	28.45	7.11	94.72	44.41
5	27.00	21	2.96E+07	4.91E-02	3.03E+03	3.44	2.04	1.92	1.80	6.61	6.20	0.165	0.659	12.14	3.04	40.10	18.81	29.14	7.28	96.23	45.13
6	28.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	2.05	1.92	1.80	6.56	6.16	0.161	0.646	12.39	3.10	40.63	19.06	29.72	7.43	97.52	45.75
7	30.00	23	2.96E+07	4.91E-02	3.21E+03	3.40	2.06	1.92	1.80	6.53	6.12	0.159	0.636	12.58	3.15	41.06	19.27	30.20	7.55	98.55	46.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-02	-
Chainage	0+674	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.03	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	14.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-02	1.20	22.00	19.50	15.00	448.99	177.91	14.04	3.51
BH-02	1.20	23.50	21.00	16.50	476.93	199.84	14.45	3.61
BH-02	1.20	25.00	22.50	18.00	505.13	221.77	14.98	3.74
BH-02	1.20	26.50	24.00	19.50	533.07	243.70	15.43	3.86
BH-02	1.20	28.00	25.50	21.00	561.00	265.63	15.80	3.95
BH-02	1.20	29.50	27.00	22.50	588.94	287.56	16.12	4.03
BH-02	1.20	30.00	27.50	23.00	598.25	294.87	16.38	4.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.00	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.00	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.00	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.25	102.00	5.65	22.98	166.51	189.49	75.80	19.89
5	8.50	10.00	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	114.75	127.50	5.65	29.55	204.69	257.23	102.89	30.54
6	10.00	11.50	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	140.25	153.00	5.65	36.12	242.87	331.53	132.61	43.03
7	11.50	13.00	1.50	Granular	17.00	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	165.75	178.50	5.65	45.97	379.14	513.76	205.51	58.28
8	13.00	14.50	1.50	Granular	18.90	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	192.68	206.85	5.65	53.44	438.50	626.56	250.62	75.62
9	14.50	16.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	15.25	16.00	213.67	220.49	5.65	57.14	396.56	641.77	256.71	93.99
10	16.00	17.50	1.50	Granular	9.69	0.09	27	-	13.80	15.50	1.00	-	16.75	17.50	227.76	235.03	5.65	60.91	422.71	728.83	291.53	113.42
11	17.50	19.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	235.03	235.03	5.65	67.51	548.57	922.20	368.88	134.70
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	235.03	235.03	5.65	67.51	548.57	989.72	395.89	155.98
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	235.03	235.03	5.65	69.84	611.50	1122.49	448.99	177.91
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	235.03	235.03	5.65	69.84	611.50	1192.33	476.93	199.84
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	235.03	235.03	5.65	69.84	612.17	1262.83	505.13	221.77
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	235.03	235.03	5.65	69.84	612.17	1332.67	533.07	243.70
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	235.03	235.03	5.65	69.84	612.17	1402.51	561.00	265.63
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	235.03	235.03	5.65	69.84	612.17	1472.35	588.94	287.56
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	235.03	235.03	1.88	23.28	612.17	1495.63	598.25	294.87

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.52E+03	4.12	1.70	1.95	1.81	8.02	7.47	0.142	0.570	14.04	3.51	56.33	26.22	33.69	8.42	135.19	62.93
2	22.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.71	1.94	1.81	7.95	7.40	0.138	0.554	14.45	3.61	57.41	26.73	34.67	8.67	137.79	64.16
3	24.00	20	2.96E+07	1.02E-01	2.79E+03	4.04	1.73	1.94	1.81	7.85	7.32	0.134	0.534	14.98	3.74	58.81	27.40	35.94	8.99	141.14	65.75
4	25.50	21	2.96E+07	1.02E-01	2.92E+03	4.00	1.75	1.94	1.81	7.78	7.25	0.130	0.519	15.43	3.86	59.98	27.95	37.02	9.26	143.96	67.09
5	27.00	21	2.96E+07	1.02E-01	3.03E+03	3.98	1.76	1.94	1.81	7.72	7.19	0.127	0.506	15.80	3.95	60.94	28.41	37.92	9.48	146.27	68.19
6	28.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.77	1.94	1.81	7.66	7.15	0.124	0.496	16.12	4.03	61.76	28.80	38.68	9.67	148.23	69.12
7	30.00	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.78	1.94	1.81	7.62	7.11	0.122	0.489	16.38	4.09	62.42	29.11	39.30	9.83	149.81	69.87

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-03	-
Chainage	0+892	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	201.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-03	1.00	22.00	19.50	16.50	310.86	139.91	10.55	2.64
BH-03	1.00	23.50	21.00	18.00	330.79	155.51	11.01	2.75
BH-03	1.00	25.00	22.50	19.50	350.73	171.12	11.38	2.84
BH-03	1.00	26.50	24.00	21.00	370.67	186.72	11.70	2.92
BH-03	1.00	28.00	25.50	22.50	390.61	202.33	11.96	2.99
BH-03	1.00	29.50	27.00	24.00	410.55	217.94	12.19	3.05
BH-03	1.00	30.00	27.50	24.50	417.19	223.14	12.38	3.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	4.71	13.16	72.31	85.46	34.18	11.38
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	4.71	18.42	94.17	125.75	50.30	18.19
5	8.50	10.00	1.50	Granular	19.00	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	116.25	130.50	4.71	23.99	119.40	174.97	69.99	26.55
6	10.00	11.50	1.50	Granular	19.00	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	144.75	159.00	4.71	29.87	143.84	229.28	91.71	36.57
7	11.50	13.00	1.50	Granular	19.00	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	173.25	187.50	4.71	38.61	239.47	363.51	145.41	49.03
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	194.40	201.29	4.71	43.32	250.99	418.36	167.34	62.81
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	201.29	201.29	4.71	48.18	326.43	541.98	216.79	77.95
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	201.29	201.29	4.71	48.18	326.43	590.16	236.06	93.09
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	201.29	201.29	4.71	49.85	363.87	677.45	270.98	108.69
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	201.29	201.29	4.71	49.85	363.87	727.30	290.92	124.30
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	201.29	201.29	4.71	49.85	363.87	777.14	310.86	139.91
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	201.29	201.29	4.71	49.85	363.87	826.99	330.79	155.51
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	201.29	201.29	4.71	49.85	363.87	876.83	350.73	171.12
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	201.29	201.29	4.71	49.85	363.87	926.68	370.67	186.72
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	201.29	201.29	4.71	49.85	363.87	976.52	390.61	202.33
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	201.29	201.29	4.71	49.85	363.87	1026.37	410.55	217.94
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	201.29	201.29	1.57	16.62	363.87	1042.98	417.19	223.14

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.63E+03	3.54	1.56	1.96	1.82	6.92	6.42	0.190	0.758	10.55	2.64	36.52	16.93	25.32	6.33	87.64	40.64
2	22.50	20	2.96E+07	4.91E-02	2.80E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.182	0.727	11.01	2.75	37.56	17.42	26.41	6.60	90.14	41.82
3	24.00	21	2.96E+07	4.91E-02	2.95E+03	3.45	1.59	1.95	1.81	6.75	6.27	0.176	0.703	11.38	2.84	38.40	17.82	27.31	6.83	92.17	42.78
4	25.50	22	2.96E+07	4.91E-02	3.08E+03	3.42	1.61	1.95	1.81	6.69	6.21	0.171	0.684	11.70	2.92	39.11	18.16	28.07	7.02	93.87	43.59
5	27.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.96	2.99	39.70	18.44	28.71	7.18	95.28	44.26
6	28.50	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.656	12.19	3.05	40.20	18.68	29.25	7.31	96.49	44.83
7	30.00	24	2.96E+07	4.91E-02	3.37E+03	3.36	1.63	1.95	1.81	6.56	6.10	0.162	0.646	12.38	3.09	40.61	18.87	29.70	7.43	97.47	45.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-03	-
Chainage	0+892	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	231.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-03	1.20	22.00	19.50	16.50	454.44	183.79	13.71	3.43
BH-03	1.20	23.50	21.00	18.00	482.00	205.45	14.30	3.57
BH-03	1.20	25.00	22.50	19.50	509.56	227.12	14.78	3.70
BH-03	1.20	26.50	24.00	21.00	537.12	248.79	15.20	3.80
BH-03	1.20	28.00	25.50	22.50	564.68	270.45	15.54	3.88
BH-03	1.20	29.50	27.00	24.00	592.24	292.12	15.83	3.96
BH-03	1.20	30.00	27.50	24.50	601.42	299.34	16.08	4.02

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	5.65	15.79	106.05	121.84	48.73	15.50
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	5.65	22.10	137.54	175.43	70.17	24.07
5	8.50	10.00	1.50	Granular	19.00	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	116.25	130.50	5.65	28.79	174.10	240.77	96.31	34.50
6	10.00	11.50	1.50	Granular	19.00	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	144.75	159.00	5.65	35.84	209.29	311.81	124.72	46.91
7	11.50	13.00	1.50	Granular	19.00	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	173.25	187.50	5.65	46.33	347.81	496.67	198.67	62.26
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	194.40	201.29	5.65	51.99	362.86	563.71	225.48	79.19
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	208.94	216.58	5.65	60.02	507.02	767.88	307.15	98.37
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	224.23	231.87	5.65	64.41	541.95	867.22	346.89	118.78
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	231.87	231.87	5.65	68.90	604.12	998.29	399.31	140.45
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	231.87	231.87	5.65	68.90	604.12	1067.19	426.87	162.12
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	231.87	231.87	5.65	68.90	604.12	1136.09	454.44	183.79
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	231.87	231.87	5.65	68.90	604.12	1204.99	482.00	205.45
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	231.87	231.87	5.65	68.90	604.12	1273.89	509.56	227.12
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	231.87	231.87	5.65	68.90	604.12	1342.79	537.12	248.79
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	231.87	231.87	5.65	68.90	604.12	1411.69	564.68	270.45
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	231.87	231.87	5.65	68.90	604.12	1480.59	592.24	292.12
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	231.87	231.87	1.88	22.97	604.12	1503.56	601.42	299.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.63E+03	4.09	1.34	1.98	1.82	8.09	7.45	0.146	0.584	13.71	3.43	55.44	25.54	32.90	8.22	133.05	61.29
2	22.50	20	2.96E+07	1.02E-01	2.80E+03	4.04	1.36	1.98	1.82	7.98	7.35	0.140	0.560	14.30	3.57	57.02	26.28	34.31	8.58	136.85	63.08
3	24.00	21	2.96E+07	1.02E-01	2.95E+03	4.00	1.38	1.97	1.82	7.89	7.28	0.135	0.541	14.78	3.70	58.30	26.89	35.48	8.87	139.93	64.53
4	25.50	22	2.96E+07	1.02E-01	3.08E+03	3.96	1.39	1.97	1.82	7.82	7.21	0.132	0.526	15.20	3.80	59.38	27.40	36.47	9.12	142.52	65.75
5	27.00	22	2.96E+07	1.02E-01	3.19E+03	3.93	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.54	3.88	60.27	27.81	37.29	9.32	144.66	66.76
6	28.50	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.505	15.83	3.96	61.04	28.17	38.00	9.50	146.49	67.62
7	30.00	24	2.96E+07	1.02E-01	3.37E+03	3.89	1.41	1.97	1.82	7.67	7.08	0.124	0.498	16.08	4.02	61.66	28.47	38.59	9.65	147.98	68.32

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-04	-
Chainage	0+996	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	195.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-04	1.00	22.00	19.50	16.50	301.37	136.24	10.85	2.71
BH-04	1.00	23.50	21.00	18.00	320.71	151.43	11.28	2.82
BH-04	1.00	25.00	22.50	19.50	340.06	166.62	11.64	2.91
BH-04	1.00	26.50	24.00	21.00	359.40	181.81	11.94	2.98
BH-04	1.00	28.00	25.50	22.50	378.74	197.00	12.19	3.05
BH-04	1.00	29.50	27.00	24.00	398.09	212.18	12.40	3.10
BH-04	1.00	30.00	27.50	24.50	404.53	217.25	12.58	3.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.01	22	-	4.00	7.59	1.00	-	6.25	7.00	63.75	76.50	4.71	11.58	48.42	60.00	24.00	10.94
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	4.71	18.42	94.17	124.17	49.67	17.74
5	8.50	10.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	114.75	127.50	4.71	23.68	116.04	169.72	67.89	26.02
6	10.00	11.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	140.25	153.00	4.71	28.94	137.91	220.53	88.21	35.78
7	11.50	13.00	1.50	Granular	19.00	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	167.25	181.50	4.71	38.65	266.64	387.91	155.16	48.25
8	13.00	14.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	188.40	195.29	4.71	43.54	279.93	444.75	177.90	62.09
9	14.50	16.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	195.29	195.29	4.71	46.75	316.56	528.12	211.25	76.83
10	16.00	17.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	195.29	195.29	4.71	46.75	316.56	574.87	229.95	91.57
11	17.50	19.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	195.29	195.29	4.71	46.75	316.56	621.61	248.65	106.31
12	19.00	20.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	195.29	195.29	4.71	46.75	316.56	668.36	267.34	121.05
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	195.29	195.29	4.71	48.36	353.26	753.42	301.37	136.24
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	195.29	195.29	4.71	48.36	353.26	801.78	320.71	151.43
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	195.29	195.29	4.71	48.36	353.26	850.14	340.06	166.62
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	195.29	195.29	4.71	48.36	353.26	898.50	359.40	181.81
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	195.29	195.29	4.71	48.36	353.26	946.86	378.74	197.00
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	195.29	195.29	4.71	48.36	353.26	995.22	398.09	212.18
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	195.29	195.29	1.57	16.12	353.26	1011.34	404.53	217.25

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.74E+03	3.51	1.57	1.96	1.81	6.86	6.36	0.184	0.737	10.85	2.71	37.21	17.26	26.04	6.51	89.29	41.42
2	22.50	21	2.96E+07	4.91E-02	2.91E+03	3.46	1.59	1.95	1.81	6.77	6.28	0.177	0.709	11.28	2.82	38.18	17.72	27.08	6.77	91.64	42.53
3	24.00	22	2.96E+07	4.91E-02	3.06E+03	3.43	1.60	1.95	1.81	6.70	6.22	0.172	0.688	11.64	2.91	38.98	18.10	27.93	6.98	93.55	43.43
4	25.50	22	2.96E+07	4.91E-02	3.18E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.168	0.670	11.94	2.98	39.65	18.41	28.65	7.16	95.15	44.20
5	27.00	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.656	12.19	3.05	40.20	18.68	29.25	7.31	96.48	44.82
6	28.50	24	2.96E+07	4.91E-02	3.38E+03	3.36	1.64	1.95	1.81	6.56	6.10	0.161	0.645	12.40	3.10	40.67	18.90	29.77	7.44	97.61	45.36
7	30.00	24	2.96E+07	4.91E-02	3.45E+03	3.35	1.64	1.95	1.81	6.53	6.07	0.159	0.636	12.58	3.14	41.06	19.08	30.19	7.55	98.53	45.80

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-04	-
Chainage	0+996	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	224.37	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-04	1.20	22.00	19.50	16.50	439.56	178.72	14.10	3.52
BH-04	1.20	23.50	21.00	18.00	466.23	199.77	14.66	3.66
BH-04	1.20	25.00	22.50	19.50	492.90	220.81	15.12	3.78
BH-04	1.20	26.50	24.00	21.00	519.57	241.85	15.51	3.88
BH-04	1.20	28.00	25.50	22.50	546.24	262.90	15.83	3.96
BH-04	1.20	29.50	27.00	24.00	572.91	283.94	16.11	4.03
BH-04	1.20	30.00	27.50	24.50	581.80	290.96	16.34	4.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.01	22	-	4.00	7.59	1.00	-	6.25	7.00	63.75	76.50	5.65	13.89	70.50	84.39	33.76	14.97
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	5.65	22.10	137.54	173.53	69.41	23.54
5	8.50	10.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	114.75	127.50	5.65	28.42	169.03	233.44	93.38	33.87
6	10.00	11.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	140.25	153.00	5.65	34.73	200.52	299.66	119.86	45.97
7	11.50	13.00	1.50	Granular	19.00	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	167.25	181.50	5.65	46.39	387.34	532.87	213.15	61.33
8	13.00	14.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	188.40	195.29	5.65	52.25	404.74	602.52	241.01	78.34
9	14.50	16.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	202.56	209.83	5.65	58.19	491.00	746.96	298.78	97.00
10	16.00	17.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	217.10	224.37	5.65	62.36	524.22	842.54	337.02	116.84
11	17.50	19.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	224.37	224.37	5.65	64.45	524.22	906.99	362.80	137.26
12	19.00	20.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	224.37	224.37	5.65	64.45	524.22	971.44	388.58	157.68
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	224.37	224.37	5.65	66.67	585.02	1098.91	439.56	178.72
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	224.37	224.37	5.65	66.67	585.02	1165.58	466.23	199.77
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	224.37	224.37	5.65	66.67	585.02	1232.25	492.90	220.81
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	224.37	224.37	5.65	66.67	585.02	1298.93	519.57	241.85
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	224.37	224.37	5.65	66.67	585.02	1365.60	546.24	262.90
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	224.37	224.37	5.65	66.67	585.02	1432.27	572.91	283.94
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	224.37	224.37	1.88	22.22	585.02	1454.50	581.80	290.96

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.74E+03	4.06	1.36	1.98	1.82	8.01	7.39	0.142	0.568	14.10	3.52	56.49	26.03	33.83	8.46	135.56	62.47
2	22.50	21	2.96E+07	1.02E-01	2.91E+03	4.01	1.37	1.97	1.82	7.91	7.29	0.136	0.546	14.66	3.66	57.97	26.73	35.18	8.79	139.13	64.15
3	24.00	22	2.96E+07	1.02E-01	3.06E+03	3.97	1.39	1.97	1.82	7.83	7.22	0.132	0.529	15.12	3.78	59.18	27.30	36.28	9.07	142.02	65.51
4	25.50	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.516	15.51	3.88	60.19	27.78	37.22	9.30	144.46	66.66
5	27.00	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.505	15.83	3.96	61.03	28.17	38.00	9.50	146.47	67.61
6	28.50	24	2.96E+07	1.02E-01	3.38E+03	3.89	1.41	1.97	1.82	7.66	7.08	0.124	0.497	16.11	4.03	61.75	28.51	38.67	9.67	148.19	68.42
7	30.00	24	2.96E+07	1.02E-01	3.45E+03	3.87	1.42	1.97	1.82	7.63	7.05	0.122	0.490	16.34	4.09	62.33	28.78	39.22	9.80	149.59	69.08

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-05	-
Chainage	1+088	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	186.58	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-05	1.00	22.00	19.50	15.00	281.10	126.36	11.52	2.88
BH-05	1.00	23.50	21.00	16.50	299.58	140.95	11.87	2.97
BH-05	1.00	25.00	22.50	18.00	318.07	155.54	12.24	3.06
BH-05	1.00	26.50	24.00	19.50	336.55	170.12	12.56	3.14
BH-05	1.00	28.00	25.50	21.00	355.03	184.71	12.82	3.21
BH-05	1.00	29.50	27.00	22.50	373.51	199.29	13.05	3.26
BH-05	1.00	30.00	27.50	23.00	379.67	204.16	13.23	3.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	4.71	18.42	94.17	112.59	45.04	14.50
5	8.50	10.00	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	116.25	130.50	4.71	23.99	119.40	161.81	64.72	22.87
6	10.00	11.50	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	144.75	159.00	4.71	29.87	143.84	216.12	86.45	32.88
7	11.50	13.00	1.50	Granular	9.19	0.06	27	-	13.80	15.50	1.00	-	12.25	13.00	165.90	172.79	4.71	36.97	216.16	325.41	130.16	44.88
8	13.00	14.50	1.50	Granular	9.19	0.06	27	-	13.80	15.50	1.00	-	13.75	14.50	179.69	186.58	4.71	40.05	233.01	382.31	152.92	57.75
9	14.50	16.00	1.50	Granular	9.09	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	186.58	186.58	4.71	43.12	267.64	460.06	184.02	71.47
10	16.00	17.50	1.50	Granular	9.09	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	186.58	186.58	4.71	43.12	267.64	503.18	201.27	85.19
11	17.50	19.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	186.58	186.58	4.71	41.58	232.96	510.08	204.03	98.49
12	19.00	20.50	1.50	Granular	10.19	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	186.58	186.58	4.71	41.58	233.56	552.26	220.90	111.78
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	186.58	186.58	4.71	46.20	337.85	702.76	281.10	126.36
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	186.58	186.58	4.71	46.20	337.85	748.96	299.58	140.95
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	186.58	186.58	4.71	46.20	337.85	795.16	318.07	155.54
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	186.58	186.58	4.71	46.20	337.85	841.37	336.55	170.12
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	186.58	186.58	4.71	46.20	337.85	887.57	355.03	184.71
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	186.58	186.58	4.71	46.20	337.85	933.77	373.51	199.29
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	186.58	186.58	1.57	15.40	337.85	949.17	379.67	204.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.174	0.694	11.52	2.88	38.72	18.15	27.65	6.91	92.92	43.55
2	22.50	21	2.96E+07	4.91E-02	2.93E+03	3.46	2.02	1.92	1.80	6.66	6.24	0.168	0.674	11.87	2.97	39.50	18.52	28.49	7.12	94.80	44.45
3	24.00	22	2.96E+07	4.91E-02	3.07E+03	3.43	2.04	1.92	1.80	6.59	6.18	0.163	0.653	12.24	3.06	40.32	18.91	29.38	7.35	96.77	45.39
4	25.50	22	2.96E+07	4.91E-02	3.20E+03	3.40	2.06	1.92	1.80	6.53	6.13	0.159	0.637	12.56	3.14	41.01	19.24	30.14	7.53	98.43	46.18
5	27.00	23	2.96E+07	4.91E-02	3.30E+03	3.38	2.07	1.92	1.80	6.49	6.09	0.156	0.624	12.82	3.21	41.58	19.51	30.77	7.69	99.79	46.83
6	28.50	24	2.96E+07	4.91E-02	3.40E+03	3.36	2.08	1.92	1.80	6.45	6.05	0.153	0.613	13.05	3.26	42.07	19.75	31.31	7.83	100.96	47.39
7	30.00	24	2.96E+07	4.91E-02	3.47E+03	3.34	2.09	1.92	1.80	6.42	6.03	0.151	0.605	13.23	3.31	42.47	19.94	31.76	7.94	101.92	47.85

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-05	-
Chainage	1+088	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	213.86	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-05	1.20	22.00	19.50	15.00	410.56	165.92	14.99	3.75
BH-05	1.20	23.50	21.00	16.50	435.98	186.09	15.44	3.86
BH-05	1.20	25.00	22.50	18.00	461.40	206.25	15.93	3.98
BH-05	1.20	26.50	24.00	19.50	486.82	226.42	16.34	4.09
BH-05	1.20	28.00	25.50	21.00	512.24	246.59	16.69	4.17
BH-05	1.20	29.50	27.00	22.50	537.66	266.76	16.98	4.25
BH-05	1.20	30.00	27.50	23.00	546.13	273.48	17.23	4.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	5.65	22.10	137.54	159.64	63.86	19.65
5	8.50	10.00	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	116.25	130.50	5.65	28.79	174.10	224.99	89.99	30.08
6	10.00	11.50	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	144.75	159.00	5.65	35.84	209.29	296.03	118.41	42.49
7	11.50	13.00	1.50	Granular	9.19	0.06	27	-	13.80	15.50	1.00	-	12.25	13.00	165.90	172.79	5.65	44.37	312.71	443.81	177.52	57.29
8	13.00	14.50	1.50	Granular	9.19	0.06	27	-	13.80	15.50	1.00	-	13.75	14.50	179.69	186.58	5.65	48.05	336.98	516.13	206.45	73.12
9	14.50	16.00	1.50	Granular	9.09	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	193.40	200.22	5.65	53.64	414.61	647.40	258.96	90.52
10	16.00	17.50	1.50	Granular	9.09	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	207.04	213.86	5.65	57.42	442.19	732.40	292.96	108.97
11	17.50	19.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	213.86	213.86	5.65	57.19	384.89	732.30	292.92	127.36
12	19.00	20.50	1.50	Granular	10.19	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	213.86	213.86	5.65	57.19	385.93	790.53	316.21	145.75
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	213.86	213.86	5.65	63.55	558.25	1026.40	410.56	165.92
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	213.86	213.86	5.65	63.55	558.25	1089.95	435.98	186.09
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	213.86	213.86	5.65	63.55	558.25	1153.50	461.40	206.25
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	213.86	213.86	5.65	63.55	558.25	1217.05	486.82	226.42
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	213.86	213.86	5.65	63.55	558.25	1280.60	512.24	246.59
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	213.86	213.86	5.65	63.55	558.25	1344.15	537.66	266.76
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	213.86	213.86	1.88	21.18	558.25	1365.33	546.13	273.48

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.79E+03	4.04	1.73	1.94	1.81	7.85	7.32	0.133	0.534	14.99	3.75	58.84	27.41	35.97	8.99	141.21	65.78
2	22.50	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.75	1.94	1.81	7.77	7.25	0.129	0.518	15.44	3.86	60.03	27.98	37.07	9.27	144.07	67.14
3	24.00	22	2.96E+07	1.02E-01	3.07E+03	3.96	1.77	1.94	1.81	7.69	7.17	0.126	0.502	15.93	3.98	61.28	28.57	38.23	9.56	147.08	68.57
4	25.50	22	2.96E+07	1.02E-01	3.20E+03	3.93	1.78	1.94	1.81	7.63	7.12	0.122	0.489	16.34	4.09	62.34	29.07	39.22	9.81	149.61	69.78
5	27.00	23	2.96E+07	1.02E-01	3.30E+03	3.91	1.79	1.94	1.81	7.58	7.07	0.120	0.479	16.69	4.17	63.21	29.49	40.05	10.01	151.70	70.77
6	28.50	24	2.96E+07	1.02E-01	3.40E+03	3.89	1.80	1.94	1.81	7.53	7.03	0.118	0.471	16.98	4.25	63.95	29.84	40.76	10.19	153.48	71.62
7	30.00	24	2.96E+07	1.02E-01	3.47E+03	3.87	1.81	1.94	1.81	7.50	7.00	0.116	0.464	17.23	4.31	64.56	30.13	41.34	10.34	154.95	72.32

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-06	-
Chainage	1+192	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	204.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-06	1.00	22.00	19.50	16.50	318.38	143.69	10.59	2.65
BH-06	1.00	23.50	21.00	18.00	338.62	159.50	10.85	2.71
BH-06	1.00	25.00	22.50	19.50	358.85	175.32	11.10	2.77
BH-06	1.00	26.50	24.00	21.00	379.09	191.13	11.44	2.86
BH-06	1.00	28.00	25.50	22.50	399.33	206.95	11.72	2.93
BH-06	1.00	29.50	27.00	24.00	419.56	222.76	11.96	2.99
BH-06	1.00	30.00	27.50	24.50	426.31	228.03	12.16	3.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.03	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	4.71	12.63	64.34	76.97	30.79	11.23
4	7.00	8.50	1.50	Granular	19.00	0.03	24	-	8.00	9.78	1.00	-	7.75	8.50	90.75	105.00	4.71	17.98	86.95	117.56	47.02	17.92
5	8.50	10.00	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	119.25	133.50	4.71	28.55	224.98	284.13	113.65	27.56
6	10.00	11.50	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	147.75	162.00	4.71	35.37	270.20	364.72	145.89	39.11
7	11.50	13.00	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	176.25	190.50	4.71	42.19	315.42	452.12	180.85	52.57
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	197.40	204.29	4.71	47.25	330.49	514.45	205.78	67.45
9	14.50	16.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	204.29	204.29	4.71	47.22	292.57	523.75	209.50	82.32
10	16.00	17.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	204.29	204.29	4.71	47.22	292.57	570.97	228.39	97.19
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	204.29	204.29	4.71	48.90	331.18	658.48	263.39	112.53
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	204.29	204.29	4.71	48.90	331.18	707.38	282.95	127.88
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	204.29	204.29	4.71	50.59	369.18	795.96	318.38	143.69
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	204.29	204.29	4.71	50.59	369.18	846.55	338.62	159.50
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	204.29	204.29	4.71	50.59	369.18	897.14	358.85	175.32
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	204.29	204.29	4.71	50.59	369.18	947.72	379.09	191.13
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	204.29	204.29	4.71	50.59	369.18	998.31	399.33	206.95
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	204.29	204.29	4.71	50.59	369.18	1048.90	419.56	222.76
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	204.29	204.29	1.57	16.86	369.18	1065.76	426.31	228.03

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.56	1.96	1.82	6.91	6.41	0.189	0.755	10.59	2.65	36.61	16.98	25.43	6.36	87.87	40.75
2	22.50	19	2.96E+07	4.91E-02	2.74E+03	3.51	1.57	1.96	1.81	6.86	6.36	0.184	0.737	10.85	2.71	37.21	17.26	26.05	6.51	89.31	41.43
3	24.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.77	17.53	26.64	6.66	90.65	42.06
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.59	1.95	1.81	6.74	6.26	0.175	0.700	11.44	2.86	38.53	17.88	27.45	6.86	92.47	42.92
5	27.00	22	2.96E+07	4.91E-02	3.09E+03	3.42	1.61	1.95	1.81	6.68	6.21	0.171	0.683	11.72	2.93	39.16	18.18	28.12	7.03	93.97	43.64
6	28.50	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.96	2.99	39.69	18.44	28.70	7.17	95.26	44.24
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.165	0.658	12.16	3.04	40.13	18.64	29.17	7.29	96.31	44.74

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-06	-
Chainage	1+192	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	231.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-06	1.20	22.00	19.50	16.50	459.18	187.11	13.76	3.44
BH-06	1.20	23.50	21.00	18.00	486.74	208.77	14.10	3.53
BH-06	1.20	25.00	22.50	19.50	514.30	230.44	14.42	3.60
BH-06	1.20	26.50	24.00	21.00	541.86	252.11	14.86	3.71
BH-06	1.20	28.00	25.50	22.50	569.42	273.78	15.22	3.80
BH-06	1.20	29.50	27.00	24.00	596.98	295.44	15.53	3.88
BH-06	1.20	30.00	27.50	24.50	606.17	302.67	15.79	3.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.03	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	5.65	15.15	94.20	109.35	43.74	15.33
4	7.00	8.50	1.50	Granular	19.00	0.03	24	-	8.00	9.78	1.00	-	7.75	8.50	90.75	105.00	5.65	21.57	126.93	163.66	65.46	23.74
5	8.50	10.00	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	119.25	133.50	5.65	34.25	327.77	398.75	159.50	35.71
6	10.00	11.50	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	147.75	162.00	5.65	42.44	392.88	506.31	202.52	49.97
7	11.50	13.00	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	176.25	190.50	5.65	50.63	457.99	622.04	248.82	66.52
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	197.40	204.29	5.65	56.70	477.74	698.50	279.40	84.77
9	14.50	16.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	211.19	218.08	5.65	58.57	450.83	730.15	292.06	103.54
10	16.00	17.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	224.98	231.87	5.65	62.40	478.72	820.44	328.17	123.39
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	231.87	231.87	5.65	66.60	541.95	950.28	380.11	144.41
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	231.87	231.87	5.65	66.60	541.95	1016.88	406.75	165.44
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	231.87	231.87	5.65	68.90	604.12	1147.95	459.18	187.11
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	231.87	231.87	5.65	68.90	604.12	1216.85	486.74	208.77
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	231.87	231.87	5.65	68.90	604.12	1285.75	514.30	230.44
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	231.87	231.87	5.65	68.90	604.12	1354.65	541.86	252.11
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	231.87	231.87	5.65	68.90	604.12	1423.55	569.42	273.78
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	231.87	231.87	5.65	68.90	604.12	1492.45	596.98	295.44
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	231.87	231.87	1.88	22.97	604.12	1515.42	606.17	302.67

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.35	1.98	1.82	8.08	7.44	0.145	0.581	13.76	3.44	55.59	25.61	33.03	8.26	133.41	61.46
2	22.50	19	2.96E+07	1.02E-01	2.74E+03	4.06	1.36	1.98	1.82	8.01	7.39	0.142	0.567	14.10	3.53	56.50	26.04	33.84	8.46	135.59	62.49
3	24.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.42	3.60	57.34	26.43	34.61	8.65	137.62	63.44
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.135	0.538	14.86	3.71	58.50	26.98	35.65	8.91	140.39	64.74
5	27.00	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.39	1.97	1.82	7.81	7.21	0.131	0.526	15.22	3.80	59.45	27.42	36.53	9.13	142.67	65.82
6	28.50	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.53	3.88	60.26	27.81	37.28	9.32	144.62	66.74
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.91	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.79	3.95	60.93	28.12	37.90	9.47	146.22	67.49

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-07	-
Chainage	1+277	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	186.58	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-07	1.00	22.00	19.50	19.50	299.69	139.38	10.85	2.71
BH-07	1.00	23.50	21.00	21.00	318.17	153.96	11.10	2.78
BH-07	1.00	25.00	22.50	22.50	336.65	168.55	11.31	2.83
BH-07	1.00	26.50	24.00	24.00	355.13	183.13	11.48	2.87
BH-07	1.00	28.00	25.50	25.50	373.62	197.72	11.62	2.91
BH-07	1.00	29.50	27.00	27.00	392.10	212.31	11.74	2.94
BH-07	1.00	30.00	27.50	27.50	398.26	217.17	11.84	2.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.75	25.50	4.71	2.42	21.47	23.90	9.56	5.08
2	4.00	5.50	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	38.25	51.00	4.71	7.26	38.93	48.61	19.44	8.76
3	5.50	7.00	1.50	Granular	17.00	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	63.75	76.50	4.71	14.21	102.73	126.62	50.65	14.39
4	7.00	8.50	1.50	Granular	17.00	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	89.25	102.00	4.71	19.89	133.90	177.68	71.07	21.60
5	8.50	10.00	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	116.25	130.50	4.71	23.99	119.40	187.17	74.87	29.97
6	10.00	11.50	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	144.75	159.00	4.71	29.87	143.84	241.48	96.59	39.98
7	11.50	13.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	165.90	172.79	4.71	39.71	280.52	417.87	167.15	52.75
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	179.69	186.58	4.71	43.01	302.39	482.76	193.10	66.45
9	14.50	16.00	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	15.25	16.00	186.58	186.58	4.71	46.20	337.01	563.57	225.43	81.03
10	16.00	17.50	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	16.75	17.50	186.58	186.58	4.71	46.20	337.01	609.77	243.91	95.62
11	17.50	19.00	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	186.58	186.58	4.71	46.20	337.01	655.98	262.39	110.20
12	19.00	20.50	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	186.58	186.58	4.71	46.20	337.01	702.18	280.87	124.79
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	186.58	186.58	4.71	46.20	337.85	749.23	299.69	139.38
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	186.58	186.58	4.71	46.20	337.85	795.43	318.17	153.96
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	186.58	186.58	4.71	46.20	337.85	841.63	336.65	168.55
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	186.58	186.58	4.71	46.20	337.85	887.84	355.13	183.13
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	186.58	186.58	4.71	46.20	337.85	934.04	373.62	197.72
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	186.58	186.58	4.71	46.20	337.85	980.24	392.10	212.31
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	186.58	186.58	1.57	15.40	337.85	995.64	398.26	217.17

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.47E+03	3.34	0.75	2.05	1.84	6.86	6.17	0.184	0.737	10.85	2.71	37.21	16.73	26.04	6.51	89.30	40.16
2	22.50	25	2.96E+07	4.91E-02	3.60E+03	3.32	0.75	2.05	1.84	6.80	6.12	0.180	0.720	11.10	2.78	37.78	17.00	26.65	6.66	90.67	40.79
3	24.00	26	2.96E+07	4.91E-02	3.71E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.707	11.31	2.83	38.24	17.21	27.14	6.79	91.79	41.30
4	25.50	27	2.96E+07	4.91E-02	3.80E+03	3.28	0.76	2.05	1.84	6.73	6.06	0.174	0.697	11.48	2.87	38.63	17.39	27.56	6.89	92.72	41.73
5	27.00	27	2.96E+07	4.91E-02	3.87E+03	3.27	0.76	2.05	1.84	6.70	6.03	0.172	0.688	11.62	2.91	38.95	17.53	27.90	6.97	93.48	42.07
6	28.50	28	2.96E+07	4.91E-02	3.93E+03	3.26	0.77	2.05	1.84	6.68	6.01	0.170	0.681	11.74	2.94	39.22	17.65	28.19	7.05	94.12	42.37
7	30.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.676	11.84	2.96	39.43	17.75	28.42	7.10	94.64	42.60

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-07	-
Chainage	1+277	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	213.86	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-07	1.20	22.00	19.50	19.50	433.73	182.14	14.20	3.55
BH-07	1.20	23.50	21.00	21.00	459.15	202.30	14.53	3.63
BH-07	1.20	25.00	22.50	22.50	484.57	222.47	14.80	3.70
BH-07	1.20	26.50	24.00	24.00	509.99	242.64	15.03	3.76
BH-07	1.20	28.00	25.50	25.50	535.41	262.81	15.21	3.80
BH-07	1.20	29.50	27.00	27.00	560.83	282.98	15.37	3.84
BH-07	1.20	30.00	27.50	27.50	569.30	289.70	15.49	3.87

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.75	25.50	5.65	2.90	32.08	34.99	13.99	7.15
2	4.00	5.50	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	38.25	51.00	5.65	8.71	57.22	68.83	27.53	11.96
3	5.50	7.00	1.50	Granular	17.00	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	63.75	76.50	5.65	17.05	150.60	179.27	71.71	19.11
4	7.00	8.50	1.50	Granular	17.00	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	89.25	102.00	5.65	23.87	195.47	248.01	99.20	28.17
5	8.50	10.00	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	116.25	130.50	5.65	28.79	174.10	255.42	102.17	38.60
6	10.00	11.50	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	144.75	159.00	5.65	35.84	209.29	326.46	130.58	51.02
7	11.50	13.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	165.90	172.79	5.65	47.65	405.78	570.60	228.24	66.73
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	179.69	186.58	5.65	51.61	437.28	653.72	261.49	83.56
9	14.50	16.00	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	15.25	16.00	193.40	200.22	5.65	57.47	522.04	795.95	318.38	102.03
10	16.00	17.50	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	16.75	17.50	207.04	213.86	5.65	61.52	556.79	892.21	356.89	121.63
11	17.50	19.00	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	213.86	213.86	5.65	63.55	556.79	955.76	382.31	141.80
12	19.00	20.50	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	213.86	213.86	5.65	63.55	556.79	1019.31	407.73	161.97
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	213.86	213.86	5.65	63.55	558.25	1084.32	433.73	182.14
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	213.86	213.86	5.65	63.55	558.25	1147.87	459.15	202.30
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	213.86	213.86	5.65	63.55	558.25	1211.42	484.57	222.47
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	213.86	213.86	5.65	63.55	558.25	1274.97	509.99	242.64
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	213.86	213.86	5.65	63.55	558.25	1338.52	535.41	262.81
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	213.86	213.86	5.65	63.55	558.25	1402.07	560.83	282.98
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	213.86	213.86	1.88	21.18	558.25	1423.25	569.30	289.70

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.47E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.563	14.20	3.55	56.77	25.40	34.09	8.52	136.25	60.97
2	22.50	25	2.96E+07	1.02E-01	3.60E+03	3.84	0.65	2.07	1.85	7.93	7.10	0.138	0.550	14.53	3.63	57.64	25.80	34.88	8.72	138.34	61.92
3	24.00	26	2.96E+07	1.02E-01	3.71E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.80	3.70	58.35	26.12	35.52	8.88	140.03	62.69
4	25.50	27	2.96E+07	1.02E-01	3.80E+03	3.80	0.66	2.06	1.85	7.85	7.03	0.133	0.532	15.03	3.76	58.94	26.39	36.06	9.02	141.45	63.34
5	27.00	27	2.96E+07	1.02E-01	3.87E+03	3.79	0.66	2.06	1.85	7.81	7.00	0.131	0.526	15.21	3.80	59.42	26.61	36.50	9.13	142.61	63.86
6	28.50	28	2.96E+07	1.02E-01	3.93E+03	3.77	0.66	2.06	1.85	7.79	6.97	0.130	0.521	15.37	3.84	59.83	26.79	36.88	9.22	143.58	64.31
7	30.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.77	6.96	0.129	0.516	15.49	3.87	60.15	26.94	37.18	9.29	144.36	64.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-08	-
Chainage	1+388	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	201.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-08	1.00	22.00	19.50	16.50	312.07	140.76	11.22	2.81
BH-08	1.00	23.50	21.00	18.00	332.01	156.36	11.62	2.91
BH-08	1.00	25.00	22.50	19.50	351.95	171.97	11.95	2.99
BH-08	1.00	26.50	24.00	21.00	371.88	187.57	12.23	3.06
BH-08	1.00	28.00	25.50	22.50	391.82	203.18	12.46	3.11
BH-08	1.00	29.50	27.00	24.00	411.76	218.79	12.65	3.16
BH-08	1.00	30.00	27.50	24.50	418.41	223.99	12.81	3.20

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.06	20	-	0.00	5.39	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.06	20	-	0.00	5.39	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	4.71	13.16	72.31	85.46	34.18	11.38
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	4.71	18.42	94.17	125.75	50.30	18.19
5	8.50	10.00	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	116.25	130.50	4.71	23.99	119.40	174.97	69.99	26.55
6	10.00	11.50	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	144.75	159.00	4.71	29.87	143.84	229.28	91.71	36.57
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	173.25	187.50	4.71	40.04	275.06	400.54	160.21	49.43
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	194.40	201.29	4.71	44.93	288.36	458.76	183.50	63.66
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	201.29	201.29	4.71	48.18	326.43	545.01	218.00	78.80
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	201.29	201.29	4.71	48.18	326.43	593.19	237.28	93.94
11	17.50	19.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	18.25	19.00	201.29	201.29	4.71	49.85	363.87	680.49	272.19	109.54
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	201.29	201.29	4.71	49.85	363.87	730.33	292.13	125.15
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	201.29	201.29	4.71	49.85	363.87	780.18	312.07	140.76
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	201.29	201.29	4.71	49.85	363.87	830.02	332.01	156.36
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	201.29	201.29	4.71	49.85	363.87	879.87	351.95	171.97
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	201.29	201.29	4.71	49.85	363.87	929.71	371.88	187.57
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	201.29	201.29	4.71	49.85	363.87	979.56	391.82	203.18
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	201.29	201.29	4.71	49.85	363.87	1029.40	411.76	218.79
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	201.29	201.29	1.57	16.62	363.87	1046.02	418.41	223.99

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.89E+03	3.47	1.59	1.95	1.81	6.78	6.29	0.178	0.713	11.22	2.81	38.05	17.66	26.94	6.73	91.33	42.38
2	22.50	21	2.96E+07	4.91E-02	3.05E+03	3.43	1.60	1.95	1.81	6.70	6.22	0.172	0.688	11.62	2.91	38.95	18.08	27.89	6.97	93.47	43.40
3	24.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.670	11.95	2.99	39.67	18.43	28.68	7.17	95.21	44.22
4	25.50	23	2.96E+07	4.91E-02	3.30E+03	3.38	1.63	1.95	1.81	6.59	6.12	0.164	0.654	12.23	3.06	40.28	18.72	29.34	7.34	96.68	44.92
5	27.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	1.64	1.95	1.81	6.55	6.09	0.161	0.642	12.46	3.11	40.79	18.95	29.89	7.47	97.89	45.49
6	28.50	24	2.96E+07	4.91E-02	3.49E+03	3.34	1.65	1.95	1.81	6.52	6.06	0.158	0.632	12.65	3.16	41.21	19.16	30.36	7.59	98.92	45.98
7	30.00	25	2.96E+07	4.91E-02	3.55E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.81	3.20	41.56	19.32	30.75	7.69	99.75	46.37

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-08	-
Chainage	1+388	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	231.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-08	1.20	22.00	19.50	16.50	455.89	184.80	14.58	3.65
BH-08	1.20	23.50	21.00	18.00	483.45	206.47	15.10	3.77
BH-08	1.20	25.00	22.50	19.50	511.01	228.14	15.52	3.88
BH-08	1.20	26.50	24.00	21.00	538.57	249.81	15.88	3.97
BH-08	1.20	28.00	25.50	22.50	566.13	271.47	16.18	4.05
BH-08	1.20	29.50	27.00	24.00	593.69	293.14	16.44	4.11
BH-08	1.20	30.00	27.50	24.50	602.88	300.36	16.64	4.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.06	20	-	0.00	5.39	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.06	20	-	0.00	5.39	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	5.65	15.79	106.05	121.84	48.73	15.50
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	5.65	22.10	137.54	175.43	70.17	24.07
5	8.50	10.00	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	116.25	130.50	5.65	28.79	174.10	240.77	96.31	34.50
6	10.00	11.50	1.50	Granular	19.00	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	144.75	159.00	5.65	35.84	209.29	311.81	124.72	46.91
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	173.25	187.50	5.65	48.05	399.48	550.04	220.02	62.74
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	194.40	201.29	5.65	53.91	416.88	621.36	248.54	80.21
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	208.94	216.58	5.65	60.02	507.02	771.52	308.61	99.39
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	224.23	231.87	5.65	64.41	541.95	870.86	348.34	119.80
11	17.50	19.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	18.25	19.00	231.87	231.87	5.65	68.90	604.12	1001.93	400.77	141.47
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	231.87	231.87	5.65	68.90	604.12	1070.83	428.33	163.14
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	231.87	231.87	5.65	68.90	604.12	1139.73	455.89	184.80
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	231.87	231.87	5.65	68.90	604.12	1208.63	483.45	206.47
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	231.87	231.87	5.65	68.90	604.12	1277.53	511.01	228.14
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	231.87	231.87	5.65	68.90	604.12	1346.43	538.57	249.81
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	231.87	231.87	5.65	68.90	604.12	1415.33	566.13	271.47
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	231.87	231.87	5.65	68.90	604.12	1484.24	593.69	293.14
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	231.87	231.87	1.88	22.97	604.12	1507.20	602.88	300.36

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.89E+03	4.01	1.37	1.97	1.82	7.92	7.31	0.137	0.549	14.58	3.65	57.77	26.64	34.99	8.75	138.65	63.93
2	22.50	21	2.96E+07	1.02E-01	3.05E+03	3.97	1.39	1.97	1.82	7.83	7.23	0.132	0.530	15.10	3.77	59.13	27.27	36.23	9.06	141.91	65.46
3	24.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.52	3.88	60.23	27.79	37.25	9.31	144.55	66.70
4	25.50	23	2.96E+07	1.02E-01	3.30E+03	3.91	1.41	1.97	1.82	7.70	7.11	0.126	0.504	15.88	3.97	61.16	28.23	38.12	9.53	146.78	67.76
5	27.00	24	2.96E+07	1.02E-01	3.40E+03	3.89	1.42	1.97	1.82	7.65	7.07	0.124	0.494	16.18	4.05	61.92	28.59	38.83	9.71	148.61	68.62
6	28.50	24	2.96E+07	1.02E-01	3.49E+03	3.87	1.42	1.97	1.82	7.61	7.03	0.122	0.487	16.44	4.11	62.57	28.90	39.45	9.86	150.18	69.36
7	30.00	25	2.96E+07	1.02E-01	3.55E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.481	16.64	4.16	63.10	29.15	39.95	9.99	151.44	69.95

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-09	-
Chainage	1+449	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	201.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-09	1.00	22.00	19.50	18.00	316.95	144.17	11.10	2.77
BH-09	1.00	23.50	21.00	19.50	336.89	159.78	11.43	2.86
BH-09	1.00	25.00	22.50	21.00	356.83	175.38	11.69	2.92
BH-09	1.00	26.50	24.00	22.50	376.77	190.99	11.92	2.98
BH-09	1.00	28.00	25.50	24.00	396.70	206.60	12.10	3.03
BH-09	1.00	29.50	27.00	25.50	416.64	222.20	12.26	3.07
BH-09	1.00	30.00	27.50	26.00	423.29	227.40	12.39	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	38.25	51.00	4.71	7.89	50.44	58.33	23.33	8.26
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	4.71	13.16	72.31	93.35	37.34	13.59
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	4.71	18.42	94.17	133.64	53.46	20.40
5	8.50	10.00	1.50	Granular	19.00	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	116.25	130.50	4.71	25.91	169.81	235.19	94.07	29.30
6	10.00	11.50	1.50	Granular	19.00	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	144.75	159.00	4.71	32.26	204.64	302.28	120.91	39.98
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	173.25	187.50	4.71	40.04	275.06	412.74	165.10	52.84
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	194.40	201.29	4.71	44.93	288.36	470.96	188.39	67.07
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	201.29	201.29	4.71	48.18	326.43	557.21	222.89	82.21
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	201.29	201.29	4.71	48.18	326.43	605.40	242.16	97.35
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	201.29	201.29	4.71	49.85	363.87	692.69	277.07	112.96
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	201.29	201.29	4.71	49.85	363.87	742.53	297.01	128.57
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	201.29	201.29	4.71	49.85	363.87	792.38	316.95	144.17
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	201.29	201.29	4.71	49.85	363.87	842.22	336.89	159.78
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	201.29	201.29	4.71	49.85	363.87	892.07	356.83	175.38
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	201.29	201.29	4.71	49.85	363.87	941.91	376.77	190.99
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	201.29	201.29	4.71	49.85	363.87	991.76	396.70	206.60
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	201.29	201.29	4.71	49.85	363.87	1041.60	416.64	222.20
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	201.29	201.29	1.57	16.62	363.87	1058.22	423.29	227.40

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.15E+03	3.41	1.17	2.00	1.83	6.81	6.23	0.180	0.721	11.10	2.77	37.77	17.29	26.64	6.66	90.65	41.51
2	22.50	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.18	1.99	1.83	6.74	6.18	0.175	0.700	11.43	2.86	38.51	17.64	27.42	6.86	92.41	42.33
3	24.00	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.69	2.92	39.10	17.92	28.06	7.02	93.85	43.00
4	25.50	25	2.96E+07	4.91E-02	3.52E+03	3.34	1.20	1.99	1.83	6.65	6.09	0.168	0.671	11.92	2.98	39.61	18.15	28.60	7.15	95.05	43.57
5	27.00	25	2.96E+07	4.91E-02	3.60E+03	3.32	1.20	1.99	1.83	6.61	6.06	0.165	0.661	12.10	3.03	40.02	18.35	29.05	7.26	96.04	44.03
6	28.50	26	2.96E+07	4.91E-02	3.68E+03	3.31	1.21	1.99	1.83	6.58	6.04	0.163	0.652	12.26	3.07	40.37	18.51	29.43	7.36	96.88	44.42
7	30.00	26	2.96E+07	4.91E-02	3.74E+03	3.30	1.21	1.99	1.83	6.56	6.02	0.161	0.646	12.39	3.10	40.65	18.64	29.74	7.44	97.55	44.74

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-09	-
Chainage	1+449	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	231.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-09	1.20	22.00	19.50	18.00	461.75	188.90	14.44	3.61
BH-09	1.20	23.50	21.00	19.50	489.31	210.57	14.87	3.72
BH-09	1.20	25.00	22.50	21.00	516.87	232.24	15.21	3.80
BH-09	1.20	26.50	24.00	22.50	544.43	253.91	15.51	3.88
BH-09	1.20	28.00	25.50	24.00	571.99	275.57	15.75	3.94
BH-09	1.20	29.50	27.00	25.50	599.55	297.24	15.95	3.99
BH-09	1.20	30.00	27.50	26.00	608.74	304.46	16.12	4.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	38.25	51.00	5.65	9.47	74.56	84.03	33.61	11.36
3	5.50	7.00	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	63.75	76.50	5.65	15.79	106.05	131.31	52.52	18.16
4	7.00	8.50	1.50	Granular	17.00	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	89.25	102.00	5.65	22.10	137.54	184.90	73.96	26.72
5	8.50	10.00	1.50	Granular	19.00	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	116.25	130.50	5.65	31.09	247.51	325.96	130.38	37.80
6	10.00	11.50	1.50	Granular	19.00	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	144.75	159.00	5.65	38.71	297.66	414.82	165.93	51.01
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	173.25	187.50	5.65	48.05	399.48	564.69	225.87	66.84
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	194.40	201.29	5.65	53.91	416.88	636.00	254.40	84.31
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	208.94	216.58	5.65	60.02	507.02	786.16	314.46	103.49
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	224.23	231.87	5.65	64.41	541.95	885.50	354.20	123.90
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	231.87	231.87	5.65	68.90	604.12	1016.57	406.63	145.57
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	231.87	231.87	5.65	68.90	604.12	1085.47	434.19	167.24
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	231.87	231.87	5.65	68.90	604.12	1154.37	461.75	188.90
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	231.87	231.87	5.65	68.90	604.12	1223.27	489.31	210.57
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	231.87	231.87	5.65	68.90	604.12	1292.17	516.87	232.24
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	231.87	231.87	5.65	68.90	604.12	1361.08	544.43	253.91
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	231.87	231.87	5.65	68.90	604.12	1429.98	571.99	275.57
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	231.87	231.87	5.65	68.90	604.12	1498.88	599.55	297.24
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	231.87	231.87	1.88	22.97	604.12	1521.84	608.74	304.46

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.15E+03	3.95	1.01	2.01	1.83	7.95	7.23	0.138	0.554	14.44	3.61	57.41	26.12	34.66	8.67	137.78	62.70
2	22.50	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.02	2.01	1.83	7.87	7.17	0.135	0.538	14.87	3.72	58.52	26.64	35.68	8.92	140.45	63.94
3	24.00	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.81	7.12	0.131	0.526	15.21	3.80	59.43	27.06	36.51	9.13	142.62	64.95
4	25.50	25	2.96E+07	1.02E-01	3.52E+03	3.86	1.04	2.01	1.83	7.76	7.07	0.129	0.516	15.51	3.88	60.19	27.41	37.21	9.30	144.45	65.80
5	27.00	25	2.96E+07	1.02E-01	3.60E+03	3.84	1.04	2.01	1.83	7.72	7.04	0.127	0.508	15.75	3.94	60.81	27.70	37.79	9.45	145.95	66.49
6	28.50	26	2.96E+07	1.02E-01	3.68E+03	3.83	1.05	2.01	1.83	7.69	7.01	0.125	0.501	15.95	3.99	61.34	27.95	38.29	9.57	147.22	67.08
7	30.00	26	2.96E+07	1.02E-01	3.74E+03	3.81	1.05	2.01	1.83	7.66	6.98	0.124	0.496	16.12	4.03	61.77	28.15	38.69	9.67	148.24	67.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-01	-
Chainage	0+571	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-01	1.00	22.00	19.50	19.50	165.60	86.25	10.76	2.69
BH-01	1.00	23.50	21.00	21.00	175.94	95.14	10.86	2.72
BH-01	1.00	25.00	22.50	22.50	186.27	104.02	11.07	2.77
BH-01	1.00	26.50	24.00	24.00	196.60	112.90	11.25	2.81
BH-01	1.00	28.00	25.50	25.50	206.94	121.78	11.39	2.85
BH-01	1.00	29.50	27.00	27.00	217.27	130.67	11.51	2.88
BH-01	1.00	30.00	27.50	27.50	220.71	133.63	11.60	2.90

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	4.71	1.07	10.59	11.66	4.66	4.70
2	4.00	5.50	1.50	Granular	7.19	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	4.71	3.21	18.91	23.18	9.27	7.24
3	5.50	7.00	1.50	Granular	9.19	0.01	27	-	13.80	15.50	1.00	-	6.25	7.00	28.48	35.37	4.71	6.35	48.22	58.85	23.54	10.67
4	7.00	8.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	7.75	8.50	42.27	49.16	4.71	10.12	84.37	105.11	42.04	15.15
5	8.50	10.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	56.06	62.95	4.71	13.42	106.25	140.41	56.16	20.56
6	10.00	11.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	69.85	76.74	4.71	16.72	128.13	179.00	71.60	26.89
7	11.50	13.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	12.25	13.00	83.64	90.53	4.71	20.02	150.01	220.90	88.36	34.15
8	13.00	14.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	13.75	14.50	97.43	104.32	4.71	23.32	171.89	266.10	106.44	42.32
9	14.50	16.00	1.50	Granular	9.19	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	104.32	104.32	4.71	24.97	171.89	291.07	116.43	50.97
10	16.00	17.50	1.50	Granular	9.19	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	104.32	104.32	4.71	24.97	171.89	316.04	126.42	59.61
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	104.32	104.32	4.71	25.83	192.35	362.35	144.94	68.49
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	104.32	104.32	4.71	25.83	192.35	388.18	155.27	77.37
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	104.32	104.32	4.71	25.83	192.35	414.01	165.60	86.25
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	104.32	104.32	4.71	25.83	192.35	439.84	175.94	95.14
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	104.32	104.32	4.71	25.83	192.35	465.68	186.27	104.02
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	104.32	104.32	4.71	25.83	192.35	491.51	196.60	112.90
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	104.32	104.32	4.71	25.83	192.35	517.34	206.94	121.78
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	104.32	104.32	4.71	25.83	192.35	543.17	217.27	130.67
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	104.32	104.32	1.57	8.61	192.35	551.78	220.71	133.63

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.43E+03	3.35	0.75	2.05	1.84	6.88	6.18	0.186	0.743	10.76	2.69	37.00	16.64	25.82	6.46	88.79	39.93
2	22.50	24	2.96E+07	4.91E-02	3.48E+03	3.34	0.75	2.05	1.84	6.85	6.17	0.184	0.736	10.86	2.72	37.23	16.75	26.07	6.52	89.36	40.19
3	24.00	25	2.96E+07	4.91E-02	3.58E+03	3.32	0.75	2.05	1.84	6.81	6.13	0.181	0.723	11.07	2.77	37.71	16.96	26.57	6.64	90.50	40.71
4	25.50	26	2.96E+07	4.91E-02	3.67E+03	3.31	0.76	2.05	1.84	6.78	6.10	0.178	0.711	11.25	2.81	38.10	17.14	26.99	6.75	91.45	41.14
5	27.00	26	2.96E+07	4.91E-02	3.75E+03	3.29	0.76	2.05	1.84	6.75	6.07	0.176	0.702	11.39	2.85	38.43	17.29	27.34	6.83	92.22	41.50
6	28.50	27	2.96E+07	4.91E-02	3.81E+03	3.28	0.76	2.05	1.84	6.72	6.05	0.174	0.695	11.51	2.88	38.70	17.41	27.63	6.91	92.87	41.80
7	30.00	27	2.96E+07	4.91E-02	3.86E+03	3.27	0.76	2.05	1.84	6.71	6.04	0.172	0.689	11.60	2.90	38.91	17.51	27.85	6.96	93.38	42.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-01	-
Chainage	0+571	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	131.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-01	1.20	22.00	19.50	19.50	259.20	118.41	14.08	3.52
BH-01	1.20	23.50	21.00	21.00	274.87	131.76	14.22	3.55
BH-01	1.20	25.00	22.50	22.50	290.55	145.11	14.49	3.62
BH-01	1.20	26.50	24.00	24.00	306.23	158.46	14.72	3.68
BH-01	1.20	28.00	25.50	25.50	321.91	171.81	14.90	3.73
BH-01	1.20	29.50	27.00	27.00	337.59	185.16	15.06	3.77
BH-01	1.20	30.00	27.50	27.50	375.16	189.73	15.18	3.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	5.65	1.28	15.90	17.18	6.87	6.69
2	4.00	5.50	1.50	Granular	7.19	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	5.65	3.85	27.88	33.01	13.20	10.14
3	5.50	7.00	1.50	Granular	9.19	0.01	27	-	13.80	15.50	1.00	-	6.25	7.00	28.48	35.37	5.65	7.62	70.88	83.63	33.45	14.65
4	7.00	8.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	7.75	8.50	42.27	49.16	5.65	12.14	123.33	148.22	59.29	20.43
5	8.50	10.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	56.06	62.95	5.65	16.10	154.84	195.82	78.33	27.31
6	10.00	11.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	69.85	76.74	5.65	20.06	186.34	247.39	98.96	35.30
7	11.50	13.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	12.25	13.00	83.64	90.53	5.65	24.02	217.85	302.92	121.17	44.40
8	13.00	14.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	13.75	14.50	97.43	104.32	5.65	27.99	249.35	362.41	144.96	54.62
9	14.50	16.00	1.50	Granular	9.19	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	111.22	118.11	5.65	31.95	280.86	425.86	170.35	65.94
10	16.00	17.50	1.50	Granular	9.19	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	125.01	131.90	5.65	35.91	312.36	493.28	197.31	78.36
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	131.90	131.90	5.65	39.19	349.49	569.60	227.84	91.71
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	131.90	131.90	5.65	39.19	349.49	608.80	243.52	105.06
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	131.90	131.90	5.65	39.19	349.49	647.99	259.20	118.41
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	131.90	131.90	5.65	39.19	349.49	687.19	274.87	131.76
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	131.90	131.90	5.65	39.19	349.49	726.38	290.55	145.11
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	131.90	131.90	5.65	39.19	349.49	765.57	306.23	158.46
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	131.90	131.90	5.65	39.19	349.49	804.77	321.91	171.81
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	131.90	131.90	5.65	39.19	349.49	843.96	337.59	185.16
19	29.50	30.00	0.50	Granular	10.19	0.00	31	-	25.00	27.56	1.00	-	29.75	30.00	131.90	131.90	1.88	13.50	429.93	937.91	375.16	189.73

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.43E+03	3.88	0.64	2.07	1.85	8.02	7.17	0.142	0.568	14.08	3.52	56.45	25.26	33.80	8.45	135.48	60.62
2	22.50	24	2.96E+07	1.02E-01	3.48E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.563	14.22	3.55	56.81	25.42	34.13	8.53	136.35	61.02
3	24.00	25	2.96E+07	1.02E-01	3.58E+03	3.84	0.65	2.07	1.85	7.94	7.11	0.138	0.552	14.49	3.62	57.53	25.75	34.78	8.69	138.07	61.80
4	25.50	26	2.96E+07	1.02E-01	3.67E+03	3.83	0.65	2.06	1.85	7.90	7.07	0.136	0.544	14.72	3.68	58.13	26.02	35.33	8.83	139.52	62.46
5	27.00	26	2.96E+07	1.02E-01	3.75E+03	3.81	0.66	2.06	1.85	7.87	7.04	0.134	0.537	14.90	3.73	58.62	26.25	35.77	8.94	140.70	62.99
6	28.50	27	2.96E+07	1.02E-01	3.81E+03	3.80	0.66	2.06	1.85	7.84	7.02	0.133	0.531	15.06	3.77	59.03	26.43	36.15	9.04	141.68	63.44
7	30.00	27	2.96E+07	1.02E-01	3.86E+03	3.79	0.66	2.06	1.85	7.82	7.00	0.132	0.527	15.18	3.80	59.35	26.58	36.44	9.11	142.45	63.79

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-02	-
Chainage	0+674	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	89.17	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-02	1.00	22.00	19.50	15.00	134.48	72.08	10.79	2.70
BH-02	1.00	23.50	21.00	16.50	143.31	79.91	11.11	2.78
BH-02	1.00	25.00	22.50	18.00	152.30	87.74	11.51	2.88
BH-02	1.00	26.50	24.00	19.50	161.13	95.57	11.86	2.96
BH-02	1.00	28.00	25.50	21.00	169.96	103.40	12.14	3.04
BH-02	1.00	29.50	27.00	22.50	178.79	111.24	12.39	3.10
BH-02	1.00	30.00	27.50	23.00	181.74	113.85	12.58	3.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.00	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.00	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.00	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	37.77	43.16	4.71	8.10	48.25	56.36	22.54	11.62
5	8.50	10.00	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	48.56	53.95	4.71	10.42	59.47	78.00	31.20	16.18
6	10.00	11.50	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	59.35	64.74	4.71	12.74	70.69	101.95	40.78	21.40
7	11.50	13.00	1.50	Granular	7.19	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	70.14	75.53	4.71	16.21	110.52	157.99	63.20	27.59
8	13.00	14.50	1.50	Granular	9.09	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	82.35	89.17	4.71	19.03	130.85	197.35	78.94	34.56
9	14.50	16.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	15.25	16.00	89.17	89.17	4.71	19.87	113.92	200.29	80.12	41.78
10	16.00	17.50	1.50	Granular	9.69	0.09	27	-	13.80	15.50	1.00	-	16.75	17.50	89.17	89.17	4.71	19.87	114.24	220.49	88.20	48.99
11	17.50	19.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	89.17	89.17	4.71	21.35	148.20	275.79	110.32	56.62
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	89.17	89.17	4.71	21.35	148.20	297.14	118.85	64.24
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	89.17	89.17	4.71	22.08	165.17	336.19	134.48	72.08
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	89.17	89.17	4.71	22.08	165.17	358.27	143.31	79.91
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	89.17	89.17	4.71	22.08	165.56	380.74	152.30	87.74
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	89.17	89.17	4.71	22.08	165.56	402.82	161.13	95.57
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	89.17	89.17	4.71	22.08	165.56	424.90	169.96	103.40
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	89.17	89.17	4.71	22.08	165.56	446.98	178.79	111.24
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	89.17	89.17	1.57	7.36	165.56	454.34	181.74	113.85

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.52E+03	3.56	1.96	1.93	1.80	6.87	6.43	0.185	0.741	10.79	2.70	37.07	17.36	25.91	6.48	88.98	41.67
2	22.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.98	1.93	1.80	6.80	6.38	0.180	0.720	11.11	2.78	37.78	17.70	26.65	6.66	90.68	42.48
3	24.00	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.174	0.695	11.51	2.88	38.70	18.14	27.63	6.91	92.88	43.53
4	25.50	21	2.96E+07	4.91E-02	2.92E+03	3.46	2.02	1.92	1.80	6.66	6.24	0.169	0.675	11.86	2.96	39.47	18.50	28.45	7.11	94.72	44.41
5	27.00	21	2.96E+07	4.91E-02	3.03E+03	3.44	2.04	1.92	1.80	6.61	6.20	0.165	0.659	12.14	3.04	40.10	18.81	29.14	7.28	96.23	45.13
6	28.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	2.05	1.92	1.80	6.56	6.16	0.161	0.646	12.39	3.10	40.63	19.06	29.72	7.43	97.52	45.75
7	30.00	23	2.96E+07	4.91E-02	3.21E+03	3.40	2.06	1.92	1.80	6.53	6.12	0.159	0.636	12.58	3.15	41.06	19.27	30.20	7.55	98.55	46.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-02	-
Chainage	0+674	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	117.35	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-02	1.20	22.00	19.50	15.00	219.59	101.25	14.04	3.51
BH-02	1.20	23.50	21.00	16.50	233.54	113.39	14.45	3.61
BH-02	1.20	25.00	22.50	18.00	247.75	125.53	14.98	3.74
BH-02	1.20	26.50	24.00	19.50	261.70	137.67	15.43	3.86
BH-02	1.20	28.00	25.50	21.00	275.65	149.81	15.80	3.95
BH-02	1.20	29.50	27.00	22.50	289.60	161.95	16.12	4.03
BH-02	1.20	30.00	27.50	23.00	294.25	165.99	16.38	4.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.00	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.00	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.00	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	37.77	43.16	5.65	9.73	70.46	80.18	32.07	16.18
5	8.50	10.00	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	48.56	53.95	5.65	12.50	86.61	108.84	43.54	22.06
6	10.00	11.50	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	59.35	64.74	5.65	15.28	102.77	140.28	56.11	28.71
7	11.50	13.00	1.50	Granular	7.19	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	70.14	75.53	5.65	19.45	160.43	217.39	86.96	36.53
8	13.00	14.50	1.50	Granular	9.09	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	82.35	89.17	5.65	22.84	190.04	269.85	107.94	45.30
9	14.50	16.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	15.25	16.00	95.99	102.81	5.65	25.67	189.47	294.94	117.98	54.87
10	16.00	17.50	1.50	Granular	9.69	0.09	27	-	13.80	15.50	1.00	-	16.75	17.50	110.08	117.35	5.65	29.44	215.62	350.54	140.21	65.49
11	17.50	19.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	117.35	117.35	5.65	33.71	279.72	448.34	179.34	77.30
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	117.35	117.35	5.65	33.71	279.72	482.05	192.82	89.11
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	117.35	117.35	5.65	34.87	311.77	548.97	219.59	101.25
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	117.35	117.35	5.65	34.87	311.77	583.84	233.54	113.39
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	117.35	117.35	5.65	34.87	312.43	619.38	247.75	125.53
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	117.35	117.35	5.65	34.87	312.43	654.25	261.70	137.67
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	117.35	117.35	5.65	34.87	312.43	689.12	275.65	149.81
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	117.35	117.35	5.65	34.87	312.43	723.99	289.60	161.95
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	117.35	117.35	1.88	11.62	312.43	735.62	294.25	165.99

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.52E+03	4.12	1.70	1.95	1.81	8.02	7.47	0.142	0.570	14.04	3.51	56.33	26.22	33.69	8.42	135.19	62.93
2	22.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.71	1.94	1.81	7.95	7.40	0.138	0.554	14.45	3.61	57.41	26.73	34.67	8.67	137.79	64.16
3	24.00	20	2.96E+07	1.02E-01	2.79E+03	4.04	1.73	1.94	1.81	7.85	7.32	0.134	0.534	14.98	3.74	58.81	27.40	35.94	8.99	141.14	65.75
4	25.50	21	2.96E+07	1.02E-01	2.92E+03	4.00	1.75	1.94	1.81	7.78	7.25	0.130	0.519	15.43	3.86	59.98	27.95	37.02	9.26	143.96	67.09
5	27.00	21	2.96E+07	1.02E-01	3.03E+03	3.98	1.76	1.94	1.81	7.72	7.19	0.127	0.506	15.80	3.95	60.94	28.41	37.92	9.48	146.27	68.19
6	28.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.77	1.94	1.81	7.66	7.15	0.124	0.496	16.12	4.03	61.76	28.80	38.68	9.67	148.23	69.12
7	30.00	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.78	1.94	1.81	7.62	7.11	0.122	0.489	16.38	4.09	62.42	29.11	39.30	9.83	149.81	69.87

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-03	-
Chainage	0+892	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-03	1.00	22.00	19.50	16.50	150.56	78.69	10.55	2.64
BH-03	1.00	23.50	21.00	18.00	160.30	87.16	11.01	2.75
BH-03	1.00	25.00	22.50	19.50	170.03	95.63	11.38	2.84
BH-03	1.00	26.50	24.00	21.00	179.77	104.09	11.70	2.92
BH-03	1.00	28.00	25.50	22.50	189.51	112.56	11.96	2.99
BH-03	1.00	29.50	27.00	24.00	199.25	121.03	12.19	3.05
BH-03	1.00	30.00	27.50	24.50	202.50	123.85	12.38	3.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	4.71	5.57	30.60	36.16	14.46	9.26
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	4.71	7.79	39.85	53.21	21.28	13.09
5	8.50	10.00	1.50	Granular	9.19	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	50.06	56.95	4.71	10.33	52.46	76.15	30.46	17.63
6	10.00	11.50	1.50	Granular	9.19	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	63.85	70.74	4.71	13.17	64.29	101.15	40.46	22.97
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	77.64	84.53	4.71	17.30	108.30	162.47	64.99	29.46
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	91.43	98.32	4.71	20.38	125.15	199.70	79.88	36.82
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	98.32	98.32	4.71	23.54	163.06	261.14	104.45	45.05
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	98.32	98.32	4.71	23.54	163.06	284.67	113.87	53.29
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	98.32	98.32	4.71	24.35	181.74	327.70	131.08	61.76
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	98.32	98.32	4.71	24.35	181.74	352.05	140.82	70.23
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	98.32	98.32	4.71	24.35	181.74	376.39	150.56	78.69
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	98.32	98.32	4.71	24.35	181.74	400.74	160.30	87.16
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	98.32	98.32	4.71	24.35	181.74	425.09	170.03	95.63
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	98.32	98.32	4.71	24.35	181.74	449.43	179.77	104.09
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	98.32	98.32	4.71	24.35	181.74	473.78	189.51	112.56
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	98.32	98.32	4.71	24.35	181.74	498.13	199.25	121.03
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	98.32	98.32	1.57	8.12	181.74	506.24	202.50	123.85

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.63E+03	3.54	1.56	1.96	1.82	6.92	6.42	0.190	0.758	10.55	2.64	36.52	16.93	25.32	6.33	87.64	40.64
2	22.50	20	2.96E+07	4.91E-02	2.80E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.182	0.727	11.01	2.75	37.56	17.42	26.41	6.60	90.14	41.82
3	24.00	21	2.96E+07	4.91E-02	2.95E+03	3.45	1.59	1.95	1.81	6.75	6.27	0.176	0.703	11.38	2.84	38.40	17.82	27.31	6.83	92.17	42.78
4	25.50	22	2.96E+07	4.91E-02	3.08E+03	3.42	1.61	1.95	1.81	6.69	6.21	0.171	0.684	11.70	2.92	39.11	18.16	28.07	7.02	93.87	43.59
5	27.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.96	2.99	39.70	18.44	28.71	7.18	95.28	44.26
6	28.50	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.656	12.19	3.05	40.20	18.68	29.25	7.31	96.49	44.83
7	30.00	24	2.96E+07	4.91E-02	3.37E+03	3.36	1.63	1.95	1.81	6.56	6.10	0.162	0.646	12.38	3.09	40.61	18.87	29.70	7.43	97.47	45.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-03	-
Chainage	0+892	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	128.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-03	1.20	22.00	19.50	16.50	244.59	110.33	13.71	3.43
BH-03	1.20	23.50	21.00	18.00	259.91	123.43	14.30	3.57
BH-03	1.20	25.00	22.50	19.50	275.23	136.53	14.78	3.70
BH-03	1.20	26.50	24.00	21.00	290.56	149.63	15.20	3.80
BH-03	1.20	28.00	25.50	22.50	305.88	162.73	15.54	3.88
BH-03	1.20	29.50	27.00	24.00	321.20	175.83	15.83	3.96
BH-03	1.20	30.00	27.50	24.50	326.31	180.20	16.08	4.02

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	5.65	6.68	44.87	51.55	20.62	12.95
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	5.65	9.35	58.20	74.23	29.69	17.95
5	8.50	10.00	1.50	Granular	9.19	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	50.06	56.95	5.65	12.40	76.59	105.02	42.01	23.79
6	10.00	11.50	1.50	Granular	9.19	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	63.85	70.74	5.65	15.81	93.62	137.86	55.14	30.59
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	77.64	84.53	5.65	20.76	157.39	222.39	88.96	38.78
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	91.43	98.32	5.65	24.45	181.66	271.11	108.44	48.00
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	105.97	113.61	5.65	30.44	271.77	391.66	156.66	58.90
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	121.26	128.90	5.65	34.83	306.71	461.42	184.57	71.03
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	128.90	128.90	5.65	38.30	341.85	534.87	213.95	84.13
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	128.90	128.90	5.65	38.30	341.85	573.18	229.27	97.23
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	128.90	128.90	5.65	38.30	341.85	611.48	244.59	110.33
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	128.90	128.90	5.65	38.30	341.85	649.78	259.91	123.43
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	128.90	128.90	5.65	38.30	341.85	688.09	275.23	136.53
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	128.90	128.90	5.65	38.30	341.85	726.39	290.56	149.63
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	128.90	128.90	5.65	38.30	341.85	764.69	305.88	162.73
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	128.90	128.90	5.65	38.30	341.85	803.00	321.20	175.83
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	128.90	128.90	1.88	12.77	341.85	815.76	326.31	180.20

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.63E+03	4.09	1.34	1.98	1.82	8.09	7.45	0.146	0.584	13.71	3.43	55.44	25.54	32.90	8.22	133.05	61.29
2	22.50	20	2.96E+07	1.02E-01	2.80E+03	4.04	1.36	1.98	1.82	7.98	7.35	0.140	0.560	14.30	3.57	57.02	26.28	34.31	8.58	136.85	63.08
3	24.00	21	2.96E+07	1.02E-01	2.95E+03	4.00	1.38	1.97	1.82	7.89	7.28	0.135	0.541	14.78	3.70	58.30	26.89	35.48	8.87	139.93	64.53
4	25.50	22	2.96E+07	1.02E-01	3.08E+03	3.96	1.39	1.97	1.82	7.82	7.21	0.132	0.526	15.20	3.80	59.38	27.40	36.47	9.12	142.52	65.75
5	27.00	22	2.96E+07	1.02E-01	3.19E+03	3.93	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.54	3.88	60.27	27.81	37.29	9.32	144.66	66.76
6	28.50	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.505	15.83	3.96	61.04	28.17	38.00	9.50	146.49	67.62
7	30.00	24	2.96E+07	1.02E-01	3.37E+03	3.89	1.41	1.97	1.82	7.67	7.08	0.124	0.498	16.08	4.02	61.66	28.47	38.59	9.65	147.98	68.32

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-04	-
Chainage	0+996	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	92.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-04	1.00	22.00	19.50	16.50	141.46	75.29	10.85	2.71
BH-04	1.00	23.50	21.00	18.00	150.60	83.34	11.28	2.82
BH-04	1.00	25.00	22.50	19.50	159.75	91.40	11.64	2.91
BH-04	1.00	26.50	24.00	21.00	168.89	99.45	11.94	2.98
BH-04	1.00	28.00	25.50	22.50	178.03	107.50	12.19	3.05
BH-04	1.00	29.50	27.00	24.00	187.18	115.55	12.40	3.10
BH-04	1.00	30.00	27.50	24.50	190.23	118.23	12.58	3.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.01	22	-	4.00	7.59	1.00	-	6.25	7.00	26.98	32.37	4.71	4.90	20.49	25.39	10.16	9.07
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	4.71	7.79	39.85	52.54	21.02	12.90
5	8.50	10.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	48.56	53.95	4.71	10.02	49.10	71.81	28.73	17.35
6	10.00	11.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	59.35	64.74	4.71	12.25	58.36	93.31	37.33	22.43
7	11.50	13.00	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	71.64	78.53	4.71	16.56	115.97	167.48	66.99	28.72
8	13.00	14.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	85.43	92.32	4.71	19.74	135.33	206.59	82.64	35.90
9	14.50	16.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	92.32	92.32	4.71	22.10	153.19	246.55	98.62	43.73
10	16.00	17.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	92.32	92.32	4.71	22.10	153.19	268.65	107.46	51.57
11	17.50	19.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	92.32	92.32	4.71	22.10	153.19	290.75	116.30	59.41
12	19.00	20.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	92.32	92.32	4.71	22.10	153.19	312.85	125.14	67.24
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	92.32	92.32	4.71	22.86	171.13	353.64	141.46	75.29
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	92.32	92.32	4.71	22.86	171.13	376.50	150.60	83.34
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	92.32	92.32	4.71	22.86	171.13	399.36	159.75	91.40
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	92.32	92.32	4.71	22.86	171.13	422.23	168.89	99.45
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	92.32	92.32	4.71	22.86	171.13	445.09	178.03	107.50
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	92.32	92.32	4.71	22.86	171.13	467.95	187.18	115.55
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	92.32	92.32	1.57	7.62	171.13	475.57	190.23	118.23

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.74E+03	3.51	1.57	1.96	1.81	6.86	6.36	0.184	0.737	10.85	2.71	37.21	17.26	26.04	6.51	89.29	41.42
2	22.50	21	2.96E+07	4.91E-02	2.91E+03	3.46	1.59	1.95	1.81	6.77	6.28	0.177	0.709	11.28	2.82	38.18	17.72	27.08	6.77	91.64	42.53
3	24.00	22	2.96E+07	4.91E-02	3.06E+03	3.43	1.60	1.95	1.81	6.70	6.22	0.172	0.688	11.64	2.91	38.98	18.10	27.93	6.98	93.55	43.43
4	25.50	22	2.96E+07	4.91E-02	3.18E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.168	0.670	11.94	2.98	39.65	18.41	28.65	7.16	95.15	44.20
5	27.00	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.656	12.19	3.05	40.20	18.68	29.25	7.31	96.48	44.82
6	28.50	24	2.96E+07	4.91E-02	3.38E+03	3.36	1.64	1.95	1.81	6.56	6.10	0.161	0.645	12.40	3.10	40.67	18.90	29.77	7.44	97.61	45.36
7	30.00	24	2.96E+07	4.91E-02	3.45E+03	3.35	1.64	1.95	1.81	6.53	6.07	0.159	0.636	12.58	3.14	41.06	19.08	30.19	7.55	98.53	45.80

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-04	-
Chainage	0+996	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	121.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-04	1.20	22.00	19.50	16.50	230.19	105.60	14.10	3.52
BH-04	1.20	23.50	21.00	18.00	244.62	118.07	14.66	3.66
BH-04	1.20	25.00	22.50	19.50	259.05	130.55	15.12	3.78
BH-04	1.20	26.50	24.00	21.00	273.48	143.02	15.51	3.88
BH-04	1.20	28.00	25.50	22.50	287.91	155.50	15.83	3.96
BH-04	1.20	29.50	27.00	24.00	302.34	167.97	16.11	4.03
BH-04	1.20	30.00	27.50	24.50	307.15	172.13	16.34	4.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.01	22	-	4.00	7.59	1.00	-	6.25	7.00	26.98	32.37	5.65	5.88	29.83	35.71	14.28	12.73
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	5.65	9.35	58.20	73.43	29.37	17.72
5	8.50	10.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	48.56	53.95	5.65	12.02	71.52	98.78	39.51	23.46
6	10.00	11.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	59.35	64.74	5.65	14.70	84.85	126.80	50.72	29.95
7	11.50	13.00	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	71.64	78.53	5.65	19.87	168.63	230.45	92.18	37.89
8	13.00	14.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	85.43	92.32	5.65	23.69	196.52	282.03	112.81	46.90
9	14.50	16.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	99.59	106.86	5.65	28.61	255.75	369.87	147.95	57.29
10	16.00	17.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	114.13	121.40	5.65	32.78	288.97	435.87	174.35	68.84
11	17.50	19.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	121.40	121.40	5.65	34.87	288.97	470.74	188.30	80.98
12	19.00	20.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	121.40	121.40	5.65	34.87	288.97	505.62	202.25	93.12
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	121.40	121.40	5.65	36.07	322.75	575.47	230.19	105.60
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	121.40	121.40	5.65	36.07	322.75	611.54	244.62	118.07
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	121.40	121.40	5.65	36.07	322.75	647.62	259.05	130.55
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	121.40	121.40	5.65	36.07	322.75	683.69	273.48	143.02
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	121.40	121.40	5.65	36.07	322.75	719.76	287.91	155.50
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	121.40	121.40	5.65	36.07	322.75	755.84	302.34	167.97
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	121.40	121.40	1.88	12.02	322.75	767.86	307.15	172.13

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.74E+03	4.06	1.36	1.98	1.82	8.01	7.39	0.142	0.568	14.10	3.52	56.49	26.03	33.83	8.46	135.56	62.47
2	22.50	21	2.96E+07	1.02E-01	2.91E+03	4.01	1.37	1.97	1.82	7.91	7.29	0.136	0.546	14.66	3.66	57.97	26.73	35.18	8.79	139.13	64.15
3	24.00	22	2.96E+07	1.02E-01	3.06E+03	3.97	1.39	1.97	1.82	7.83	7.22	0.132	0.529	15.12	3.78	59.18	27.30	36.28	9.07	142.02	65.51
4	25.50	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.516	15.51	3.88	60.19	27.78	37.22	9.30	144.46	66.66
5	27.00	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.505	15.83	3.96	61.03	28.17	38.00	9.50	146.47	67.61
6	28.50	24	2.96E+07	1.02E-01	3.38E+03	3.89	1.41	1.97	1.82	7.66	7.08	0.124	0.497	16.11	4.03	61.75	28.51	38.67	9.67	148.19	68.42
7	30.00	24	2.96E+07	1.02E-01	3.45E+03	3.87	1.42	1.97	1.82	7.63	7.05	0.122	0.490	16.34	4.09	62.33	28.78	39.22	9.80	149.59	69.08

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-05	-
Chainage	1+088	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-05	1.00	22.00	19.50	15.00	145.73	75.32	11.52	2.88
BH-05	1.00	23.50	21.00	16.50	155.47	83.78	11.87	2.97
BH-05	1.00	25.00	22.50	18.00	165.21	92.25	12.24	3.06
BH-05	1.00	26.50	24.00	19.50	174.95	100.72	12.56	3.14
BH-05	1.00	28.00	25.50	21.00	184.69	109.18	12.82	3.21
BH-05	1.00	29.50	27.00	22.50	194.43	117.65	13.05	3.26
BH-05	1.00	30.00	27.50	23.00	197.67	120.47	13.23	3.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	4.71	7.79	39.85	47.64	19.06	11.53
5	8.50	10.00	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	50.06	56.95	4.71	10.33	52.46	70.59	28.23	16.07
6	10.00	11.50	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	63.85	70.74	4.71	13.17	64.29	95.59	38.23	21.41
7	11.50	13.00	1.50	Granular	9.19	0.06	27	-	13.80	15.50	1.00	-	12.25	13.00	77.64	84.53	4.71	17.30	108.30	156.90	62.76	27.90
8	13.00	14.50	1.50	Granular	9.19	0.06	27	-	13.80	15.50	1.00	-	13.75	14.50	91.43	98.32	4.71	20.38	125.15	194.13	77.65	35.26
9	14.50	16.00	1.50	Granular	9.09	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	98.32	98.32	4.71	22.72	143.70	235.40	94.16	43.27
10	16.00	17.50	1.50	Granular	9.09	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	98.32	98.32	4.71	22.72	143.70	258.12	103.25	51.28
11	17.50	19.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	98.32	98.32	4.71	21.91	125.10	261.43	104.57	59.07
12	19.00	20.50	1.50	Granular	10.19	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	98.32	98.32	4.71	21.91	125.70	283.94	113.58	66.85
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	98.32	98.32	4.71	24.35	181.74	364.33	145.73	75.32
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	98.32	98.32	4.71	24.35	181.74	388.68	155.47	83.78
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	98.32	98.32	4.71	24.35	181.74	413.03	165.21	92.25
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	98.32	98.32	4.71	24.35	181.74	437.37	174.95	100.72
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	98.32	98.32	4.71	24.35	181.74	461.72	184.69	109.18
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	98.32	98.32	4.71	24.35	181.74	486.07	194.43	117.65
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	98.32	98.32	1.57	8.12	181.74	494.18	197.67	120.47

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.174	0.694	11.52	2.88	38.72	18.15	27.65	6.91	92.92	43.55
2	22.50	21	2.96E+07	4.91E-02	2.93E+03	3.46	2.02	1.92	1.80	6.66	6.24	0.168	0.674	11.87	2.97	39.50	18.52	28.49	7.12	94.80	44.45
3	24.00	22	2.96E+07	4.91E-02	3.07E+03	3.43	2.04	1.92	1.80	6.59	6.18	0.163	0.653	12.24	3.06	40.32	18.91	29.38	7.35	96.77	45.39
4	25.50	22	2.96E+07	4.91E-02	3.20E+03	3.40	2.06	1.92	1.80	6.53	6.13	0.159	0.637	12.56	3.14	41.01	19.24	30.14	7.53	98.43	46.18
5	27.00	23	2.96E+07	4.91E-02	3.30E+03	3.38	2.07	1.92	1.80	6.49	6.09	0.156	0.624	12.82	3.21	41.58	19.51	30.77	7.69	99.79	46.83
6	28.50	24	2.96E+07	4.91E-02	3.40E+03	3.36	2.08	1.92	1.80	6.45	6.05	0.153	0.613	13.05	3.26	42.07	19.75	31.31	7.83	100.96	47.39
7	30.00	24	2.96E+07	4.91E-02	3.47E+03	3.34	2.09	1.92	1.80	6.42	6.03	0.151	0.605	13.23	3.31	42.47	19.94	31.76	7.94	101.92	47.85

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-05	-
Chainage	1+088	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-05	1.20	22.00	19.50	15.00	233.13	104.66	14.99	3.75
BH-05	1.20	23.50	21.00	16.50	248.06	117.48	15.44	3.86
BH-05	1.20	25.00	22.50	18.00	262.99	130.31	15.93	3.98
BH-05	1.20	26.50	24.00	19.50	277.92	143.14	16.34	4.09
BH-05	1.20	28.00	25.50	21.00	292.84	155.96	16.69	4.17
BH-05	1.20	29.50	27.00	22.50	307.77	168.79	16.98	4.25
BH-05	1.20	30.00	27.50	23.00	312.75	173.06	17.23	4.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	5.65	9.35	58.20	67.55	27.02	16.08
5	8.50	10.00	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	50.06	56.95	5.65	12.40	76.59	98.34	39.33	21.92
6	10.00	11.50	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	63.85	70.74	5.65	15.81	93.62	131.18	52.47	28.72
7	11.50	13.00	1.50	Granular	9.19	0.06	27	-	13.80	15.50	1.00	-	12.25	13.00	77.64	84.53	5.65	20.76	157.39	215.71	86.29	36.91
8	13.00	14.50	1.50	Granular	9.19	0.06	27	-	13.80	15.50	1.00	-	13.75	14.50	91.43	98.32	5.65	24.45	181.66	264.43	105.77	46.13
9	14.50	16.00	1.50	Granular	9.09	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	105.14	111.96	5.65	29.16	236.13	348.06	139.22	56.67
10	16.00	17.50	1.50	Granular	9.09	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	118.78	125.60	5.65	32.94	263.71	408.58	163.43	68.27
11	17.50	19.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	125.60	125.60	5.65	33.59	229.57	408.04	163.21	80.05
12	19.00	20.50	1.50	Granular	10.19	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	125.60	125.60	5.65	33.59	230.61	442.66	177.06	91.83
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	125.60	125.60	5.65	37.32	333.45	582.82	233.13	104.66
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	125.60	125.60	5.65	37.32	333.45	620.14	248.06	117.48
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	125.60	125.60	5.65	37.32	333.45	657.47	262.99	130.31
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	125.60	125.60	5.65	37.32	333.45	694.79	277.92	143.14
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	125.60	125.60	5.65	37.32	333.45	732.11	292.84	155.96
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	125.60	125.60	5.65	37.32	333.45	769.44	307.77	168.79
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	125.60	125.60	1.88	12.44	333.45	781.88	312.75	173.06

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.79E+03	4.04	1.73	1.94	1.81	7.85	7.32	0.133	0.534	14.99	3.75	58.84	27.41	35.97	8.99	141.21	65.78
2	22.50	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.75	1.94	1.81	7.77	7.25	0.129	0.518	15.44	3.86	60.03	27.98	37.07	9.27	144.07	67.14
3	24.00	22	2.96E+07	1.02E-01	3.07E+03	3.96	1.77	1.94	1.81	7.69	7.17	0.126	0.502	15.93	3.98	61.28	28.57	38.23	9.56	147.08	68.57
4	25.50	22	2.96E+07	1.02E-01	3.20E+03	3.93	1.78	1.94	1.81	7.63	7.12	0.122	0.489	16.34	4.09	62.34	29.07	39.22	9.81	149.61	69.78
5	27.00	23	2.96E+07	1.02E-01	3.30E+03	3.91	1.79	1.94	1.81	7.58	7.07	0.120	0.479	16.69	4.17	63.21	29.49	40.05	10.01	151.70	70.77
6	28.50	24	2.96E+07	1.02E-01	3.40E+03	3.89	1.80	1.94	1.81	7.53	7.03	0.118	0.471	16.98	4.25	63.95	29.84	40.76	10.19	153.48	71.62
7	30.00	24	2.96E+07	1.02E-01	3.47E+03	3.87	1.81	1.94	1.81	7.50	7.00	0.116	0.464	17.23	4.31	64.56	30.13	41.34	10.34	154.95	72.32

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-06	-
Chainage	1+192	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	101.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-06	1.00	22.00	19.50	16.50	156.48	81.35	10.59	2.65
BH-06	1.00	23.50	21.00	18.00	166.52	90.03	10.85	2.71
BH-06	1.00	25.00	22.50	19.50	176.55	98.70	11.10	2.77
BH-06	1.00	26.50	24.00	21.00	186.59	107.38	11.44	2.86
BH-06	1.00	28.00	25.50	22.50	196.63	116.05	11.72	2.93
BH-06	1.00	29.50	27.00	24.00	206.66	124.73	11.96	2.99
BH-06	1.00	30.00	27.50	24.50	210.01	127.62	12.16	3.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.03	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	4.71	5.34	27.23	32.57	13.03	9.19
4	7.00	8.50	1.50	Granular	9.19	0.03	24	-	8.00	9.78	1.00	-	7.75	8.50	39.27	46.16	4.71	7.78	38.49	51.61	20.64	13.02
5	8.50	10.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	53.06	59.95	4.71	12.70	101.49	127.31	50.93	18.23
6	10.00	11.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	66.85	73.74	4.71	16.00	123.37	165.19	66.08	24.36
7	11.50	13.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	80.64	87.53	4.71	19.30	145.25	206.37	82.55	31.41
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	94.43	101.32	4.71	22.60	167.13	250.85	100.34	39.39
9	14.50	16.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	101.32	101.32	4.71	23.42	147.97	255.12	102.05	47.59
10	16.00	17.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	101.32	101.32	4.71	23.42	147.97	278.54	111.41	55.80
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	101.32	101.32	4.71	24.25	167.82	322.64	129.05	64.24
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	101.32	101.32	4.71	24.25	167.82	346.89	138.76	72.68
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	101.32	101.32	4.71	25.09	187.05	391.21	156.48	81.35
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	101.32	101.32	4.71	25.09	187.05	416.30	166.52	90.03
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	101.32	101.32	4.71	25.09	187.05	441.39	176.55	98.70
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	101.32	101.32	4.71	25.09	187.05	466.48	186.59	107.38
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	101.32	101.32	4.71	25.09	187.05	491.56	196.63	116.05
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	101.32	101.32	4.71	25.09	187.05	516.65	206.66	124.73
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	101.32	101.32	1.57	8.36	187.05	525.02	210.01	127.62

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.56	1.96	1.82	6.91	6.41	0.189	0.755	10.59	2.65	36.61	16.98	25.43	6.36	87.87	40.75
2	22.50	19	2.96E+07	4.91E-02	2.74E+03	3.51	1.57	1.96	1.81	6.86	6.36	0.184	0.737	10.85	2.71	37.21	17.26	26.05	6.51	89.31	41.43
3	24.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.77	17.53	26.64	6.66	90.65	42.06
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.59	1.95	1.81	6.74	6.26	0.175	0.700	11.44	2.86	38.53	17.88	27.45	6.86	92.47	42.92
5	27.00	22	2.96E+07	4.91E-02	3.09E+03	3.42	1.61	1.95	1.81	6.68	6.21	0.171	0.683	11.72	2.93	39.16	18.18	28.12	7.03	93.97	43.64
6	28.50	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.96	2.99	39.69	18.44	28.70	7.17	95.26	44.24
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.165	0.658	12.16	3.04	40.13	18.64	29.17	7.29	96.31	44.74

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-06	-
Chainage	1+192	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	128.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-06	1.20	22.00	19.50	16.50	247.41	112.30	13.76	3.44
BH-06	1.20	23.50	21.00	18.00	262.73	125.40	14.10	3.53
BH-06	1.20	25.00	22.50	19.50	278.06	138.50	14.42	3.60
BH-06	1.20	26.50	24.00	21.00	293.38	151.60	14.86	3.71
BH-06	1.20	28.00	25.50	22.50	308.70	164.70	15.22	3.80
BH-06	1.20	29.50	27.00	24.00	324.02	177.80	15.53	3.88
BH-06	1.20	30.00	27.50	24.50	329.13	182.17	15.79	3.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.03	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	5.65	6.41	39.86	46.27	18.51	12.88
4	7.00	8.50	1.50	Granular	9.19	0.03	24	-	8.00	9.78	1.00	-	7.75	8.50	39.27	46.16	5.65	9.33	56.26	72.01	28.80	17.87
5	8.50	10.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	53.06	59.95	5.65	15.24	147.98	178.97	71.59	24.51
6	10.00	11.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	66.85	73.74	5.65	19.20	179.49	229.68	91.87	32.26
7	11.50	13.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	80.64	87.53	5.65	23.16	210.99	284.34	113.74	41.12
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	94.43	101.32	5.65	27.12	242.50	342.97	137.19	51.09
9	14.50	16.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	108.22	115.11	5.65	30.01	242.61	373.09	149.24	61.87
10	16.00	17.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	122.01	128.90	5.65	33.84	270.49	434.82	173.93	73.72
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	128.90	128.90	5.65	37.03	306.71	508.06	203.22	86.46
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	128.90	128.90	5.65	37.03	306.71	545.08	218.03	99.20
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	128.90	128.90	5.65	38.30	341.85	618.53	247.41	112.30
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	128.90	128.90	5.65	38.30	341.85	656.83	262.73	125.40
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	128.90	128.90	5.65	38.30	341.85	695.14	278.06	138.50
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	128.90	128.90	5.65	38.30	341.85	733.44	293.38	151.60
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	128.90	128.90	5.65	38.30	341.85	771.74	308.70	164.70
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	128.90	128.90	5.65	38.30	341.85	810.05	324.02	177.80
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	128.90	128.90	1.88	12.77	341.85	822.82	329.13	182.17

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.35	1.98	1.82	8.08	7.44	0.145	0.581	13.76	3.44	55.59	25.61	33.03	8.26	133.41	61.46
2	22.50	19	2.96E+07	1.02E-01	2.74E+03	4.06	1.36	1.98	1.82	8.01	7.39	0.142	0.567	14.10	3.53	56.50	26.04	33.84	8.46	135.59	62.49
3	24.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.42	3.60	57.34	26.43	34.61	8.65	137.62	63.44
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.135	0.538	14.86	3.71	58.50	26.98	35.65	8.91	140.39	64.74
5	27.00	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.39	1.97	1.82	7.81	7.21	0.131	0.526	15.22	3.80	59.45	27.42	36.53	9.13	142.67	65.82
6	28.50	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.53	3.88	60.26	27.81	37.28	9.32	144.62	66.74
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.91	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.79	3.95	60.93	28.12	37.90	9.47	146.22	67.49

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-07	-
Chainage	1+277	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-07	1.00	22.00	19.50	19.50	154.39	81.38	10.85	2.71
BH-07	1.00	23.50	21.00	21.00	164.13	89.84	11.10	2.78
BH-07	1.00	25.00	22.50	22.50	173.87	98.31	11.31	2.83
BH-07	1.00	26.50	24.00	24.00	183.61	106.77	11.48	2.87
BH-07	1.00	28.00	25.50	25.50	193.34	115.24	11.62	2.91
BH-07	1.00	29.50	27.00	27.00	203.08	123.71	11.74	2.94
BH-07	1.00	30.00	27.50	27.50	206.33	126.53	11.84	2.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.40	10.79	4.71	1.02	9.09	10.11	4.04	4.69
2	4.00	5.50	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	16.19	21.58	4.71	3.07	16.47	20.57	8.23	7.19
3	5.50	7.00	1.50	Granular	7.19	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	26.98	32.37	4.71	6.01	43.47	53.58	21.43	10.53
4	7.00	8.50	1.50	Granular	7.19	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	37.77	43.16	4.71	8.42	56.66	75.18	30.07	14.53
5	8.50	10.00	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	50.06	56.95	4.71	10.33	52.46	81.32	32.53	19.07
6	10.00	11.50	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	63.85	70.74	4.71	13.17	64.29	106.32	42.53	24.41
7	11.50	13.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	77.64	84.53	4.71	18.58	140.49	201.10	80.44	31.27
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	91.43	98.32	4.71	21.88	162.37	244.86	97.95	39.04
9	14.50	16.00	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	15.25	16.00	98.32	98.32	4.71	24.35	180.90	287.74	115.10	47.51
10	16.00	17.50	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	16.75	17.50	98.32	98.32	4.71	24.35	180.90	312.09	124.83	55.98
11	17.50	19.00	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	98.32	98.32	4.71	24.35	180.90	336.43	134.57	64.44
12	19.00	20.50	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	98.32	98.32	4.71	24.35	180.90	360.78	144.31	72.91
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	98.32	98.32	4.71	24.35	181.74	385.97	154.39	81.38
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	98.32	98.32	4.71	24.35	181.74	410.32	164.13	89.84
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	98.32	98.32	4.71	24.35	181.74	434.67	173.87	98.31
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	98.32	98.32	4.71	24.35	181.74	459.01	183.61	106.77
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	98.32	98.32	4.71	24.35	181.74	483.36	193.34	115.24
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	98.32	98.32	4.71	24.35	181.74	507.71	203.08	123.71
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	98.32	98.32	1.57	8.12	181.74	515.82	206.33	126.53

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.47E+03	3.34	0.75	2.05	1.84	6.86	6.17	0.184	0.737	10.85	2.71	37.21	16.73	26.04	6.51	89.30	40.16
2	22.50	25	2.96E+07	4.91E-02	3.60E+03	3.32	0.75	2.05	1.84	6.80	6.12	0.180	0.720	11.10	2.78	37.78	17.00	26.65	6.66	90.67	40.79
3	24.00	26	2.96E+07	4.91E-02	3.71E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.707	11.31	2.83	38.24	17.21	27.14	6.79	91.79	41.30
4	25.50	27	2.96E+07	4.91E-02	3.80E+03	3.28	0.76	2.05	1.84	6.73	6.06	0.174	0.697	11.48	2.87	38.63	17.39	27.56	6.89	92.72	41.73
5	27.00	27	2.96E+07	4.91E-02	3.87E+03	3.27	0.76	2.05	1.84	6.70	6.03	0.172	0.688	11.62	2.91	38.95	17.53	27.90	6.97	93.48	42.07
6	28.50	28	2.96E+07	4.91E-02	3.93E+03	3.26	0.77	2.05	1.84	6.68	6.01	0.170	0.681	11.74	2.94	39.22	17.65	28.19	7.05	94.12	42.37
7	30.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.676	11.84	2.96	39.43	17.75	28.42	7.10	94.64	42.60

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-07	-
Chainage	1+277	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-07	1.20	22.00	19.50	19.50	244.38	112.54	14.20	3.55
BH-07	1.20	23.50	21.00	21.00	259.31	125.36	14.53	3.63
BH-07	1.20	25.00	22.50	22.50	274.24	138.19	14.80	3.70
BH-07	1.20	26.50	24.00	24.00	289.17	151.01	15.03	3.76
BH-07	1.20	28.00	25.50	25.50	304.10	163.84	15.21	3.80
BH-07	1.20	29.50	27.00	27.00	319.03	176.66	15.37	3.84
BH-07	1.20	30.00	27.50	27.50	324.00	180.94	15.49	3.87

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.40	10.79	5.65	1.23	13.57	14.80	5.92	6.68
2	4.00	5.50	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	16.19	21.58	5.65	3.69	24.21	29.13	11.65	10.09
3	5.50	7.00	1.50	Granular	7.19	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	26.98	32.37	5.65	7.21	63.72	75.85	30.34	14.48
4	7.00	8.50	1.50	Granular	7.19	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	37.77	43.16	5.65	10.10	82.71	104.94	41.98	19.68
5	8.50	10.00	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	50.06	56.95	5.65	12.40	76.59	111.22	44.49	25.53
6	10.00	11.50	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	63.85	70.74	5.65	15.81	93.62	144.06	57.62	32.33
7	11.50	13.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	77.64	84.53	5.65	22.30	204.14	276.87	110.75	40.95
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	91.43	98.32	5.65	26.26	235.64	334.64	133.86	50.68
9	14.50	16.00	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	15.25	16.00	105.14	111.96	5.65	31.24	297.24	427.48	170.99	61.80
10	16.00	17.50	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	16.75	17.50	118.78	125.60	5.65	35.30	331.98	497.52	199.01	74.06
11	17.50	19.00	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	125.60	125.60	5.65	37.32	331.98	534.84	213.94	86.88
12	19.00	20.50	1.50	Granular	9.09	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	125.60	125.60	5.65	37.32	331.98	572.17	228.87	99.71
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	125.60	125.60	5.65	37.32	333.45	610.95	244.38	112.54
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	125.60	125.60	5.65	37.32	333.45	648.27	259.31	125.36
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	125.60	125.60	5.65	37.32	333.45	685.60	274.24	138.19
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	125.60	125.60	5.65	37.32	333.45	722.92	289.17	151.01
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	125.60	125.60	5.65	37.32	333.45	760.24	304.10	163.84
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	125.60	125.60	5.65	37.32	333.45	797.56	319.03	176.66
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	125.60	125.60	1.88	12.44	333.45	810.00	324.00	180.94

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.47E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.563	14.20	3.55	56.77	25.40	34.09	8.52	136.25	60.97
2	22.50	25	2.96E+07	1.02E-01	3.60E+03	3.84	0.65	2.07	1.85	7.93	7.10	0.138	0.550	14.53	3.63	57.64	25.80	34.88	8.72	138.34	61.92
3	24.00	26	2.96E+07	1.02E-01	3.71E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.80	3.70	58.35	26.12	35.52	8.88	140.03	62.69
4	25.50	27	2.96E+07	1.02E-01	3.80E+03	3.80	0.66	2.06	1.85	7.85	7.03	0.133	0.532	15.03	3.76	58.94	26.39	36.06	9.02	141.45	63.34
5	27.00	27	2.96E+07	1.02E-01	3.87E+03	3.79	0.66	2.06	1.85	7.81	7.00	0.131	0.526	15.21	3.80	59.42	26.61	36.50	9.13	142.61	63.86
6	28.50	28	2.96E+07	1.02E-01	3.93E+03	3.77	0.66	2.06	1.85	7.79	6.97	0.130	0.521	15.37	3.84	59.83	26.79	36.88	9.22	143.58	64.31
7	30.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.77	6.96	0.129	0.516	15.49	3.87	60.15	26.94	37.18	9.29	144.36	64.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-08	-
Chainage	1+388	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-08	1.00	22.00	19.50	16.50	151.12	79.08	11.22	2.81
BH-08	1.00	23.50	21.00	18.00	160.85	87.55	11.62	2.91
BH-08	1.00	25.00	22.50	19.50	170.59	96.02	11.95	2.99
BH-08	1.00	26.50	24.00	21.00	180.33	104.48	12.23	3.06
BH-08	1.00	28.00	25.50	22.50	190.07	112.95	12.46	3.11
BH-08	1.00	29.50	27.00	24.00	199.81	121.42	12.65	3.16
BH-08	1.00	30.00	27.50	24.50	203.06	124.24	12.81	3.20

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.06	20	-	0.00	5.39	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.06	20	-	0.00	5.39	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	4.71	5.57	30.60	36.16	14.46	9.26
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	4.71	7.79	39.85	53.21	21.28	13.09
5	8.50	10.00	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	50.06	56.95	4.71	10.33	52.46	76.15	30.46	17.63
6	10.00	11.50	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	63.85	70.74	4.71	13.17	64.29	101.15	40.46	22.97
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	77.64	84.53	4.71	17.94	124.39	179.20	71.68	29.64
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	91.43	98.32	4.71	21.13	143.76	219.70	87.88	37.21
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	98.32	98.32	4.71	23.54	163.06	262.53	105.01	45.45
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	98.32	98.32	4.71	23.54	163.06	286.07	114.43	53.68
11	17.50	19.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	18.25	19.00	98.32	98.32	4.71	24.35	181.74	329.09	131.64	62.15
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	98.32	98.32	4.71	24.35	181.74	353.44	141.38	70.62
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	98.32	98.32	4.71	24.35	181.74	377.79	151.12	79.08
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	98.32	98.32	4.71	24.35	181.74	402.14	160.85	87.55
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	98.32	98.32	4.71	24.35	181.74	426.48	170.59	96.02
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	98.32	98.32	4.71	24.35	181.74	450.83	180.33	104.48
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	98.32	98.32	4.71	24.35	181.74	475.18	190.07	112.95
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	98.32	98.32	4.71	24.35	181.74	499.52	199.81	121.42
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	98.32	98.32	1.57	8.12	181.74	507.64	203.06	124.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.89E+03	3.47	1.59	1.95	1.81	6.78	6.29	0.178	0.713	11.22	2.81	38.05	17.66	26.94	6.73	91.33	42.38
2	22.50	21	2.96E+07	4.91E-02	3.05E+03	3.43	1.60	1.95	1.81	6.70	6.22	0.172	0.688	11.62	2.91	38.95	18.08	27.89	6.97	93.47	43.40
3	24.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.670	11.95	2.99	39.67	18.43	28.68	7.17	95.21	44.22
4	25.50	23	2.96E+07	4.91E-02	3.30E+03	3.38	1.63	1.95	1.81	6.59	6.12	0.164	0.654	12.23	3.06	40.28	18.72	29.34	7.34	96.68	44.92
5	27.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	1.64	1.95	1.81	6.55	6.09	0.161	0.642	12.46	3.11	40.79	18.95	29.89	7.47	97.89	45.49
6	28.50	24	2.96E+07	4.91E-02	3.49E+03	3.34	1.65	1.95	1.81	6.52	6.06	0.158	0.632	12.65	3.16	41.21	19.16	30.36	7.59	98.92	45.98
7	30.00	25	2.96E+07	4.91E-02	3.55E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.81	3.20	41.56	19.32	30.75	7.69	99.75	46.37

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-08	-
Chainage	1+388	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	128.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-08	1.20	22.00	19.50	16.50	245.26	110.80	14.58	3.65
BH-08	1.20	23.50	21.00	18.00	260.58	123.90	15.10	3.77
BH-08	1.20	25.00	22.50	19.50	275.90	137.00	15.52	3.88
BH-08	1.20	26.50	24.00	21.00	291.23	150.10	15.88	3.97
BH-08	1.20	28.00	25.50	22.50	306.55	163.20	16.18	4.05
BH-08	1.20	29.50	27.00	24.00	321.87	176.30	16.44	4.11
BH-08	1.20	30.00	27.50	24.50	326.98	180.67	16.64	4.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.06	20	-	0.00	5.39	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.06	20	-	0.00	5.39	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	5.65	6.68	44.87	51.55	20.62	12.95
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	5.65	9.35	58.20	74.23	29.69	17.95
5	8.50	10.00	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	50.06	56.95	5.65	12.40	76.59	105.02	42.01	23.79
6	10.00	11.50	1.50	Granular	9.19	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	63.85	70.74	5.65	15.81	93.62	137.86	55.14	30.59
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	77.64	84.53	5.65	21.53	180.77	246.53	98.61	39.00
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	91.43	98.32	5.65	25.36	208.65	299.78	119.91	48.47
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	105.97	113.61	5.65	30.44	271.77	393.34	157.33	59.37
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	121.26	128.90	5.65	34.83	306.71	463.10	185.24	71.50
11	17.50	19.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	18.25	19.00	128.90	128.90	5.65	38.30	341.85	536.55	214.62	84.60
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	128.90	128.90	5.65	38.30	341.85	574.85	229.94	97.70
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	128.90	128.90	5.65	38.30	341.85	613.15	245.26	110.80
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	128.90	128.90	5.65	38.30	341.85	651.46	260.58	123.90
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	128.90	128.90	5.65	38.30	341.85	689.76	275.90	137.00
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	128.90	128.90	5.65	38.30	341.85	728.06	291.23	150.10
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	128.90	128.90	5.65	38.30	341.85	766.37	306.55	163.20
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	128.90	128.90	5.65	38.30	341.85	804.67	321.87	176.30
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	128.90	128.90	1.88	12.77	341.85	817.44	326.98	180.67

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.89E+03	4.01	1.37	1.97	1.82	7.92	7.31	0.137	0.549	14.58	3.65	57.77	26.64	34.99	8.75	138.65	63.93
2	22.50	21	2.96E+07	1.02E-01	3.05E+03	3.97	1.39	1.97	1.82	7.83	7.23	0.132	0.530	15.10	3.77	59.13	27.27	36.23	9.06	141.91	65.46
3	24.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.52	3.88	60.23	27.79	37.25	9.31	144.55	66.70
4	25.50	23	2.96E+07	1.02E-01	3.30E+03	3.91	1.41	1.97	1.82	7.70	7.11	0.126	0.504	15.88	3.97	61.16	28.23	38.12	9.53	146.78	67.76
5	27.00	24	2.96E+07	1.02E-01	3.40E+03	3.89	1.42	1.97	1.82	7.65	7.07	0.124	0.494	16.18	4.05	61.92	28.59	38.83	9.71	148.61	68.62
6	28.50	24	2.96E+07	1.02E-01	3.49E+03	3.87	1.42	1.97	1.82	7.61	7.03	0.122	0.487	16.44	4.11	62.57	28.90	39.45	9.86	150.18	69.36
7	30.00	25	2.96E+07	1.02E-01	3.55E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.481	16.64	4.16	63.10	29.15	39.95	9.99	151.44	69.95

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-09	-
Chainage	1+449	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-09	1.00	22.00	19.50	18.00	153.20	80.55	11.10	2.77
BH-09	1.00	23.50	21.00	19.50	162.94	89.01	11.43	2.86
BH-09	1.00	25.00	22.50	21.00	172.68	97.48	11.69	2.92
BH-09	1.00	26.50	24.00	22.50	182.42	105.94	11.92	2.98
BH-09	1.00	28.00	25.50	24.00	192.16	114.41	12.10	3.03
BH-09	1.00	29.50	27.00	25.50	201.90	122.88	12.26	3.07
BH-09	1.00	30.00	27.50	26.00	205.14	125.70	12.39	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	16.19	21.58	4.71	3.34	21.34	24.68	9.87	6.98
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	4.71	5.57	30.60	39.50	15.80	10.19
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	4.71	7.79	39.85	56.55	22.62	14.02
5	8.50	10.00	1.50	Granular	9.19	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	50.06	56.95	4.71	11.16	74.60	102.45	40.98	18.79
6	10.00	11.50	1.50	Granular	9.19	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	63.85	70.74	4.71	14.23	91.45	133.53	53.41	24.43
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	77.64	84.53	4.71	17.94	124.39	184.42	73.77	31.10
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	91.43	98.32	4.71	21.13	143.76	224.92	89.97	38.67
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	98.32	98.32	4.71	23.54	163.06	267.75	107.10	46.91
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	98.32	98.32	4.71	23.54	163.06	291.29	116.51	55.15
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	98.32	98.32	4.71	24.35	181.74	334.32	133.73	63.61
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	98.32	98.32	4.71	24.35	181.74	358.66	143.46	72.08
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	98.32	98.32	4.71	24.35	181.74	383.01	153.20	80.55
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	98.32	98.32	4.71	24.35	181.74	407.36	162.94	89.01
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	98.32	98.32	4.71	24.35	181.74	431.70	172.68	97.48
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	98.32	98.32	4.71	24.35	181.74	456.05	182.42	105.94
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	98.32	98.32	4.71	24.35	181.74	480.40	192.16	114.41
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	98.32	98.32	4.71	24.35	181.74	504.74	201.90	122.88
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	98.32	98.32	1.57	8.12	181.74	512.86	205.14	125.70

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.15E+03	3.41	1.17	2.00	1.83	6.81	6.23	0.180	0.721	11.10	2.77	37.77	17.29	26.64	6.66	90.65	41.51
2	22.50	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.18	1.99	1.83	6.74	6.18	0.175	0.700	11.43	2.86	38.51	17.64	27.42	6.86	92.41	42.33
3	24.00	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.69	2.92	39.10	17.92	28.06	7.02	93.85	43.00
4	25.50	25	2.96E+07	4.91E-02	3.52E+03	3.34	1.20	1.99	1.83	6.65	6.09	0.168	0.671	11.92	2.98	39.61	18.15	28.60	7.15	95.05	43.57
5	27.00	25	2.96E+07	4.91E-02	3.60E+03	3.32	1.20	1.99	1.83	6.61	6.06	0.165	0.661	12.10	3.03	40.02	18.35	29.05	7.26	96.04	44.03
6	28.50	26	2.96E+07	4.91E-02	3.68E+03	3.31	1.21	1.99	1.83	6.58	6.04	0.163	0.652	12.26	3.07	40.37	18.51	29.43	7.36	96.88	44.42
7	30.00	26	2.96E+07	4.91E-02	3.74E+03	3.30	1.21	1.99	1.83	6.56	6.02	0.161	0.646	12.39	3.10	40.65	18.64	29.74	7.44	97.55	44.74

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-09	-
Chainage	1+449	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	128.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-09	1.20	22.00	19.50	18.00	247.77	112.55	14.44	3.61
BH-09	1.20	23.50	21.00	19.50	263.09	125.65	14.87	3.72
BH-09	1.20	25.00	22.50	21.00	278.41	138.75	15.21	3.80
BH-09	1.20	26.50	24.00	22.50	293.73	151.85	15.51	3.88
BH-09	1.20	28.00	25.50	24.00	309.05	164.95	15.75	3.94
BH-09	1.20	29.50	27.00	25.50	324.37	178.05	15.95	3.99
BH-09	1.20	30.00	27.50	26.00	329.48	182.42	16.12	4.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{Si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	4.75	5.50	16.19	21.58	5.65	4.01	31.55	35.56	14.22	9.83
3	5.50	7.00	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	26.98	32.37	5.65	6.68	44.87	55.56	22.22	14.08
4	7.00	8.50	1.50	Granular	7.19	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	37.77	43.16	5.65	9.35	58.20	78.24	31.30	19.07
5	8.50	10.00	1.50	Granular	9.19	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	50.06	56.95	5.65	13.39	108.86	142.29	56.91	25.19
6	10.00	11.50	1.50	Granular	9.19	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	63.85	70.74	5.65	17.07	133.13	183.63	73.45	32.35
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	77.64	84.53	5.65	21.53	180.77	252.80	101.12	40.75
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	91.43	98.32	5.65	25.36	208.65	306.04	122.42	50.23
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	105.97	113.61	5.65	30.44	271.77	399.60	159.84	61.13
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	121.26	128.90	5.65	34.83	306.71	469.36	187.75	73.25
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	128.90	128.90	5.65	38.30	341.85	542.81	217.12	86.35
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	128.90	128.90	5.65	38.30	341.85	581.11	232.45	99.45
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	128.90	128.90	5.65	38.30	341.85	619.42	247.77	112.55
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	128.90	128.90	5.65	38.30	341.85	657.72	263.09	125.65
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	128.90	128.90	5.65	38.30	341.85	696.02	278.41	138.75
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	128.90	128.90	5.65	38.30	341.85	734.33	293.73	151.85
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	128.90	128.90	5.65	38.30	341.85	772.63	309.05	164.95
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	128.90	128.90	5.65	38.30	341.85	810.93	324.37	178.05
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	128.90	128.90	1.88	12.77	341.85	823.70	329.48	182.42

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.15E+03	3.95	1.01	2.01	1.83	7.95	7.23	0.138	0.554	14.44	3.61	57.41	26.12	34.66	8.67	137.78	62.70
2	22.50	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.02	2.01	1.83	7.87	7.17	0.135	0.538	14.87	3.72	58.52	26.64	35.68	8.92	140.45	63.94
3	24.00	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.81	7.12	0.131	0.526	15.21	3.80	59.43	27.06	36.51	9.13	142.62	64.95
4	25.50	25	2.96E+07	1.02E-01	3.52E+03	3.86	1.04	2.01	1.83	7.76	7.07	0.129	0.516	15.51	3.88	60.19	27.41	37.21	9.30	144.45	65.80
5	27.00	25	2.96E+07	1.02E-01	3.60E+03	3.84	1.04	2.01	1.83	7.72	7.04	0.127	0.508	15.75	3.94	60.81	27.70	37.79	9.45	145.95	66.49
6	28.50	26	2.96E+07	1.02E-01	3.68E+03	3.83	1.05	2.01	1.83	7.69	7.01	0.125	0.501	15.95	3.99	61.34	27.95	38.29	9.57	147.22	67.08
7	30.00	26	2.96E+07	1.02E-01	3.74E+03	3.81	1.05	2.01	1.83	7.66	6.98	0.124	0.496	16.12	4.03	61.77	28.15	38.69	9.67	148.24	67.56

A.3. Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-11	1.00	22.00	19.50	18.00	320.58	146.42	11.13	2.78	155.35	81.75	11.13	2.78
BH-11	1.00	23.50	21.00	19.50	340.58	162.06	11.45	2.86	165.15	90.26	11.45	2.86
BH-11	1.00	25.00	22.50	21.00	360.58	177.71	11.72	2.93	174.95	98.77	11.72	2.93
BH-11	1.00	26.50	24.00	22.50	380.57	193.36	11.94	2.99	184.75	107.28	11.94	2.99
BH-11	1.00	28.00	25.50	24.00	400.57	209.01	12.13	3.03	194.55	115.78	12.13	3.03
BH-11	1.00	29.50	27.00	25.50	420.57	224.65	12.28	3.07	204.34	124.29	12.28	3.07
BH-11	1.00	30.00	27.50	26.00	427.23	229.87	12.41	3.10	207.61	127.13	12.41	3.10
BH-11	1.20	22.00	19.50	18.00	466.33	191.68	14.48	3.62	250.57	114.09	14.48	3.62
BH-11	1.20	23.50	21.00	19.50	493.96	213.40	14.90	3.73	265.96	127.24	14.90	3.73
BH-11	1.20	25.00	22.50	21.00	521.59	235.12	15.24	3.81	281.35	140.39	15.24	3.81
BH-11	1.20	26.50	24.00	22.50	549.22	256.83	15.54	3.88	296.75	153.54	15.54	3.88
BH-11	1.20	28.00	25.50	24.00	576.86	278.55	15.78	3.94	312.14	166.69	15.78	3.94
BH-11	1.20	29.50	27.00	25.50	604.49	300.27	15.98	4.00	327.53	179.84	15.98	4.00
BH-11	1.20	30.00	27.50	26.00	613.70	307.51	16.15	4.04	332.66	184.22	16.15	4.04
BH-12	1.00	22.00	19.50	15.00	301.60	136.40	11.04	2.76	141.74	75.49	11.04	2.76
BH-12	1.00	23.50	21.00	16.50	320.95	151.59	11.52	2.88	150.89	83.54	11.52	2.88
BH-12	1.00	25.00	22.50	18.00	340.29	166.78	11.91	2.98	160.03	91.59	11.91	2.98
BH-12	1.00	26.50	24.00	19.50	359.63	181.97	12.24	3.06	169.17	99.64	12.24	3.06
BH-12	1.00	28.00	25.50	21.00	378.98	197.16	12.52	3.13	178.32	107.70	12.52	3.13

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-12	1.00	29.50	27.00	22.50	398.32	212.35	12.76	3.19	187.46	115.75	12.76	3.19
BH-12	1.00	30.00	27.50	23.00	404.77	217.41	12.95	3.24	190.51	118.43	12.95	3.24
BH-12	1.20	22.00	19.50	15.00	442.31	179.58	14.37	3.59	232.99	106.49	14.37	3.59
BH-12	1.20	23.50	21.00	16.50	469.16	200.75	14.99	3.75	247.60	119.09	14.99	3.75
BH-12	1.20	25.00	22.50	18.00	496.01	221.91	15.50	3.87	262.21	131.69	15.50	3.87
BH-12	1.20	26.50	24.00	19.50	522.85	243.08	15.93	3.98	276.82	144.29	15.93	3.98
BH-12	1.20	28.00	25.50	21.00	549.70	264.25	16.29	4.07	291.43	156.89	16.29	4.07
BH-12	1.20	29.50	27.00	22.50	576.55	285.42	16.60	4.15	306.03	169.49	16.60	4.15
BH-12	1.20	30.00	27.50	23.00	585.50	292.48	16.86	4.21	310.90	173.69	16.86	4.21
BH-13	1.00	22.00	19.50	18.00	328.52	148.93	11.19	2.80	164.48	85.10	11.19	2.80
BH-13	1.00	23.50	21.00	19.50	349.13	165.00	11.50	2.88	174.89	94.03	11.50	2.88
BH-13	1.00	25.00	22.50	21.00	369.73	181.08	11.76	2.94	185.30	102.97	11.76	2.94
BH-13	1.00	26.50	24.00	22.50	390.34	197.15	11.98	2.99	195.70	111.90	11.98	2.99
BH-13	1.00	28.00	25.50	24.00	410.95	213.22	12.16	3.04	206.11	120.84	12.16	3.04
BH-13	1.00	29.50	27.00	25.50	431.55	229.30	12.31	3.08	216.52	129.77	12.31	3.08
BH-13	1.00	30.00	27.50	26.00	438.42	234.66	12.43	3.11	219.99	132.75	12.43	3.11
BH-13	1.20	22.00	19.50	18.00	476.78	194.61	14.56	3.64	262.45	118.02	14.56	3.64
BH-13	1.20	23.50	21.00	19.50	505.14	216.84	14.97	3.74	278.57	131.68	14.97	3.74
BH-13	1.20	25.00	22.50	21.00	533.51	239.07	15.30	3.83	294.70	145.34	15.30	3.83
BH-13	1.20	26.50	24.00	22.50	561.87	261.30	15.58	3.90	310.82	159.00	15.58	3.90
BH-13	1.20	28.00	25.50	24.00	590.23	283.53	15.81	3.95	326.94	172.66	15.81	3.95
BH-13	1.20	29.50	27.00	25.50	618.59	305.76	16.01	4.00	343.07	186.32	16.01	4.00
BH-13	1.20	30.00	27.50	26.00	628.05	313.17	16.17	4.04	348.44	190.88	16.17	4.04
BH-14	1.00	22.00	19.50	15.00	294.87	128.01	10.83	2.71	144.91	74.04	10.83	2.71
BH-14	1.00	23.50	21.00	16.50	314.95	143.71	11.24	2.81	154.79	82.60	11.24	2.81

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-14	1.00	25.00	22.50	18.00	335.02	159.42	11.66	2.91	164.67	91.17	11.66	2.91
BH-14	1.00	26.50	24.00	19.50	355.10	175.12	12.01	3.00	174.55	99.73	12.01	3.00
BH-14	1.00	28.00	25.50	21.00	375.18	190.83	12.30	3.08	184.43	108.30	12.30	3.08
BH-14	1.00	29.50	27.00	22.50	395.26	206.53	12.56	3.14	194.31	116.86	12.56	3.14
BH-14	1.00	30.00	27.50	23.00	401.96	211.77	12.76	3.19	197.60	119.72	12.76	3.19
BH-14	1.20	22.00	19.50	15.00	435.13	169.25	14.09	3.52	237.70	104.49	14.09	3.52
BH-14	1.20	23.50	21.00	16.50	462.86	191.04	14.62	3.66	253.19	117.71	14.62	3.66
BH-14	1.20	25.00	22.50	18.00	490.59	212.82	15.17	3.79	268.68	130.92	15.17	3.79
BH-14	1.20	26.50	24.00	19.50	518.31	234.61	15.63	3.91	284.17	144.14	15.63	3.91
BH-14	1.20	28.00	25.50	21.00	546.04	256.40	16.01	4.00	299.66	157.36	16.01	4.00
BH-14	1.20	29.50	27.00	22.50	573.77	278.18	16.34	4.09	315.15	170.58	16.34	4.09
BH-14	1.20	30.00	27.50	23.00	583.02	285.44	16.61	4.15	320.31	174.99	16.61	4.15
BH-15	1.00	22.00	19.50	18.00	324.19	147.42	10.35	2.59	159.74	83.30	10.35	2.59
BH-15	1.00	23.50	21.00	19.50	344.49	163.28	10.53	2.63	169.84	92.02	10.53	2.63
BH-15	1.00	25.00	22.50	21.00	364.80	179.14	10.73	2.68	179.94	100.74	10.73	2.68
BH-15	1.00	26.50	24.00	22.50	385.10	195.00	10.95	2.74	190.05	109.46	10.95	2.74
BH-15	1.00	28.00	25.50	24.00	405.40	210.86	11.20	2.80	200.15	118.19	11.20	2.80
BH-15	1.00	29.50	27.00	25.50	425.70	226.72	11.41	2.85	210.25	126.91	11.41	2.85
BH-15	1.00	30.00	27.50	26.00	432.47	232.01	11.59	2.90	213.62	129.81	11.59	2.90
BH-15	1.20	22.00	19.50	18.00	468.97	192.30	13.47	3.37	254.14	115.36	13.47	3.37
BH-15	1.20	23.50	21.00	19.50	496.81	214.16	13.70	3.43	269.74	128.65	13.70	3.43
BH-15	1.20	25.00	22.50	21.00	524.65	236.02	13.96	3.49	285.34	141.95	13.96	3.49
BH-15	1.20	26.50	24.00	22.50	552.48	257.88	14.26	3.56	300.94	155.24	14.26	3.56
BH-15	1.20	28.00	25.50	24.00	580.32	279.75	14.58	3.64	316.54	168.53	14.58	3.64
BH-15	1.20	29.50	27.00	25.50	608.16	301.61	14.85	3.71	332.13	181.83	14.85	3.71

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-15	1.20	30.00	27.50	26.00	617.43	308.89	15.08	3.77	337.33	186.26	15.08	3.77
BH-16	1.00	22.00	19.50	15.00	276.91	135.39	11.00	2.75	137.23	78.10	11.00	2.75
BH-16	1.00	23.50	21.00	16.50	295.97	150.38	11.27	2.82	146.77	86.43	11.27	2.82
BH-16	1.00	25.00	22.50	18.00	315.03	165.37	11.67	2.92	156.31	94.76	11.67	2.92
BH-16	1.00	26.50	24.00	19.50	334.36	180.36	12.01	3.00	166.13	103.08	12.01	3.00
BH-16	1.00	28.00	25.50	21.00	385.45	196.30	12.28	3.07	192.00	111.89	12.28	3.07
BH-16	1.00	29.50	27.00	22.50	405.87	212.25	12.52	3.13	202.22	120.69	12.52	3.13
BH-16	1.00	30.00	27.50	23.00	412.68	217.56	12.72	3.18	205.63	123.63	12.72	3.18
BH-16	1.20	22.00	19.50	15.00	397.70	177.30	14.31	3.58	216.21	108.56	14.31	3.58
BH-16	1.20	23.50	21.00	16.50	423.80	197.95	14.66	3.67	230.88	121.21	14.66	3.67
BH-16	1.20	25.00	22.50	18.00	449.90	218.59	15.18	3.80	245.55	133.85	15.18	3.80
BH-16	1.20	26.50	24.00	19.50	476.46	239.23	15.62	3.91	260.70	146.50	15.62	3.91
BH-16	1.20	28.00	25.50	21.00	554.87	261.18	15.99	4.00	305.25	159.88	15.99	4.00
BH-16	1.20	29.50	27.00	22.50	582.83	283.13	16.30	4.07	320.97	173.26	16.30	4.07
BH-16	1.20	30.00	27.50	23.00	592.15	290.45	16.55	4.14	326.21	177.72	16.55	4.14
BH-17	1.00	22.00	19.50	18.00	321.84	145.07	11.18	2.79	159.97	82.75	11.18	2.79
BH-17	1.00	23.50	21.00	19.50	342.29	161.03	11.38	2.84	170.21	91.57	11.38	2.84
BH-17	1.00	25.00	22.50	21.00	362.73	176.99	11.56	2.89	180.45	100.39	11.56	2.89
BH-17	1.00	26.50	24.00	22.50	383.17	192.95	11.79	2.95	190.70	109.21	11.79	2.95
BH-17	1.00	28.00	25.50	24.00	403.62	208.91	11.97	2.99	200.94	118.03	11.97	2.99
BH-17	1.00	29.50	27.00	25.50	424.06	224.87	12.13	3.03	211.19	126.85	12.13	3.03
BH-17	1.00	30.00	27.50	26.00	430.87	230.19	12.25	3.06	214.60	129.79	12.25	3.06
BH-17	1.20	22.00	19.50	18.00	468.12	189.73	14.55	3.64	256.38	114.95	14.55	3.64
BH-17	1.20	23.50	21.00	19.50	496.29	211.82	14.80	3.70	272.31	128.47	14.80	3.70
BH-17	1.20	25.00	22.50	21.00	524.46	233.91	15.04	3.76	288.24	142.00	15.04	3.76

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-17	1.20	26.50	24.00	22.50	552.62	256.00	15.33	3.83	304.17	155.52	15.33	3.83
BH-17	1.20	28.00	25.50	24.00	580.79	278.10	15.57	3.89	320.09	169.04	15.57	3.89
BH-17	1.20	29.50	27.00	25.50	608.96	300.19	15.78	3.94	336.02	182.57	15.78	3.94
BH-17	1.20	30.00	27.50	26.00	618.34	307.55	15.94	3.99	341.33	187.08	15.94	3.99
BH-18	1.00	22.00	19.50	18.00	253.55	138.21	9.06	2.26	113.85	74.69	9.06	2.26
BH-18	1.00	23.50	21.00	19.50	271.89	152.70	9.14	2.29	122.09	82.10	9.14	2.29
BH-18	1.00	25.00	22.50	21.00	306.79	167.68	9.23	2.31	137.92	89.74	9.23	2.31
BH-18	1.00	26.50	24.00	22.50	325.83	182.65	9.33	2.33	146.47	97.37	9.33	2.33
BH-18	1.00	28.00	25.50	24.00	378.00	198.62	9.42	2.36	170.22	105.45	9.42	2.36
BH-18	1.00	29.50	27.00	25.50	398.46	214.59	9.56	2.39	179.41	113.53	9.56	2.39
BH-18	1.00	30.00	27.50	26.00	421.37	220.07	9.70	2.43	189.85	116.29	9.70	2.43
BH-18	1.20	22.00	19.50	18.00	371.43	184.72	11.79	2.95	176.44	103.74	11.79	2.95
BH-18	1.20	23.50	21.00	19.50	397.94	205.66	11.90	2.98	189.32	115.13	11.90	2.98
BH-18	1.20	25.00	22.50	21.00	453.00	227.30	12.02	3.01	216.32	126.86	12.02	3.01
BH-18	1.20	26.50	24.00	22.50	480.53	248.95	12.15	3.04	229.69	138.60	12.15	3.04
BH-18	1.20	28.00	25.50	24.00	565.14	272.03	12.27	3.07	271.30	151.03	12.27	3.07
BH-18	1.20	29.50	27.00	25.50	594.72	295.11	12.44	3.11	285.66	163.45	12.44	3.11
BH-18	1.20	30.00	27.50	26.00	632.43	303.04	12.63	3.16	304.23	167.71	12.63	3.16
BH-18A	1.00	22.00	19.50	16.50	321.00	143.29	11.27	2.82	161.31	82.50	11.27	2.82
BH-18A	1.00	23.50	21.00	18.00	341.68	159.42	11.53	2.88	171.79	91.49	11.53	2.88
BH-18A	1.00	25.00	22.50	19.50	362.36	175.54	11.85	2.96	182.27	100.48	11.85	2.96
BH-18A	1.00	26.50	24.00	21.00	383.04	191.67	12.12	3.03	192.75	109.46	12.12	3.03
BH-18A	1.00	28.00	25.50	22.50	403.72	207.80	12.35	3.09	203.24	118.45	12.35	3.09
BH-18A	1.00	29.50	27.00	24.00	424.41	223.92	12.54	3.13	213.72	127.44	12.54	3.13
BH-18A	1.00	30.00	27.50	24.50	431.30	229.30	12.69	3.17	217.21	130.43	12.69	3.17

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-18A	1.20	22.00	19.50	16.50	303.65	127.05	14.63	3.66	303.65	127.05	14.63	3.66
BH-18A	1.20	23.50	21.00	18.00	323.07	143.02	14.97	3.74	323.07	143.02	14.97	3.74
BH-18A	1.20	25.00	22.50	19.50	342.50	158.99	15.39	3.85	342.50	158.99	15.39	3.85
BH-18A	1.20	26.50	24.00	21.00	361.92	174.97	15.75	3.94	361.92	174.97	15.75	3.94
BH-18A	1.20	28.00	25.50	22.50	381.34	190.94	16.04	4.01	381.34	190.94	16.04	4.01
BH-18A	1.20	29.50	27.00	24.00	400.77	206.91	16.29	4.07	400.77	206.91	16.29	4.07
BH-18A	1.20	30.00	27.50	24.50	407.24	212.23	16.49	4.12	407.24	212.23	16.49	4.12
BH-19	1.00	22.00	19.50	16.50	280.47	136.03	8.96	2.24	124.51	73.13	8.96	2.24
BH-19	1.00	23.50	21.00	18.00	299.91	151.29	9.12	2.28	133.08	80.78	9.12	2.28
BH-19	1.00	25.00	22.50	19.50	352.03	167.53	9.28	2.32	156.39	88.86	9.28	2.32
BH-19	1.00	26.50	24.00	21.00	372.87	183.76	9.45	2.36	165.57	96.93	9.45	2.36
BH-19	1.00	28.00	25.50	22.50	393.71	200.00	9.62	2.41	174.75	105.01	9.62	2.41
BH-19	1.00	29.50	27.00	24.00	414.55	216.24	9.78	2.45	183.93	113.09	9.78	2.45
BH-19	1.00	30.00	27.50	24.50	421.49	221.65	9.93	2.48	186.99	115.78	9.93	2.48
BH-19	1.20	22.00	19.50	16.50	398.45	176.90	11.64	2.91	195.44	101.42	11.64	2.91
BH-19	1.20	23.50	21.00	18.00	424.67	197.63	11.85	2.96	208.60	113.01	11.85	2.96
BH-19	1.20	25.00	22.50	19.50	503.42	219.66	12.05	3.01	248.66	125.26	12.05	3.01
BH-19	1.20	26.50	24.00	21.00	531.51	241.70	12.28	3.07	262.76	137.50	12.28	3.07
BH-19	1.20	28.00	25.50	22.50	559.59	263.73	12.50	3.13	276.86	149.75	12.50	3.13
BH-19	1.20	29.50	27.00	24.00	587.68	285.77	12.71	3.18	290.96	161.99	12.71	3.18
BH-19	1.20	30.00	27.50	24.50	597.04	293.12	12.90	3.22	295.66	166.07	12.90	3.22
BH-19A	1.00	22.00	19.50	19.50	296.57	148.35	10.47	2.62	147.90	84.77	10.47	2.62
BH-19A	1.00	23.50	21.00	21.00	315.81	163.47	10.62	2.65	157.63	93.23	10.62	2.65
BH-19A	1.00	25.00	22.50	22.50	367.33	179.56	10.77	2.69	183.94	102.18	10.77	2.69
BH-19A	1.00	26.50	24.00	24.00	388.29	195.64	10.92	2.73	194.70	111.12	10.92	2.73

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-19A	1.00	28.00	25.50	25.50	408.91	211.72	11.09	2.77	205.12	120.07	11.09	2.77
BH-19A	1.00	29.50	27.00	27.00	429.53	227.81	11.24	2.81	215.54	129.01	11.24	2.81
BH-19A	1.00	30.00	27.50	27.50	436.41	233.17	11.36	2.84	219.02	131.99	11.36	2.84
BH-19A	1.20	22.00	19.50	19.50	424.04	193.75	13.70	3.43	231.77	117.46	13.70	3.43
BH-19A	1.20	23.50	21.00	21.00	450.53	214.66	13.90	3.47	246.83	130.38	13.90	3.47
BH-19A	1.20	25.00	22.50	22.50	529.98	236.91	14.09	3.52	292.43	144.05	14.09	3.52
BH-19A	1.20	26.50	24.00	24.00	558.95	259.15	14.30	3.57	309.15	157.73	14.30	3.57
BH-19A	1.20	28.00	25.50	25.50	587.33	281.39	14.52	3.63	325.29	171.40	14.52	3.63
BH-19A	1.20	29.50	27.00	27.00	615.71	303.63	14.71	3.68	341.43	185.07	14.71	3.68
BH-19A	1.20	30.00	27.50	27.50	625.17	311.04	14.86	3.71	346.81	189.63	14.86	3.71
BH-20	1.00	22.00	19.50	18.00	269.28	138.16	8.54	2.13	122.05	75.37	8.54	2.13
BH-20	1.00	23.50	21.00	19.50	288.57	153.15	8.54	2.13	130.85	83.01	8.54	2.13
BH-20	1.00	25.00	22.50	21.00	340.81	169.12	8.54	2.13	154.67	91.10	8.54	2.13
BH-20	1.00	26.50	24.00	22.50	361.28	185.10	8.54	2.13	163.87	99.19	8.54	2.13
BH-20	1.00	27.50	25.00	23.50	391.28	196.08	8.54	2.13	177.52	104.73	8.54	2.13
BH-20	1.20	22.00	19.50	18.00	377.79	178.98	11.12	2.78	187.31	103.63	11.12	2.78
BH-20	1.20	23.50	21.00	19.50	403.80	199.27	11.12	2.78	200.73	115.11	11.12	2.78
BH-20	1.20	25.00	22.50	21.00	482.59	220.90	11.12	2.78	241.29	127.27	11.12	2.78
BH-20	1.20	26.50	24.00	22.50	510.09	242.52	11.12	2.78	255.27	139.42	11.12	2.78
BH-20	1.20	27.50	25.00	23.50	554.70	257.38	11.12	2.78	278.20	147.75	11.12	2.78
BH-20A	1.00	22.00	19.50	16.50	317.86	141.65	11.45	2.86	158.65	81.20	11.45	2.86
BH-20A	1.00	23.50	21.00	18.00	338.43	157.70	11.80	2.95	169.02	90.11	11.80	2.95
BH-20A	1.00	25.00	22.50	19.50	358.99	173.74	12.15	3.04	179.39	99.02	12.15	3.04
BH-20A	1.00	26.50	24.00	21.00	379.56	189.79	12.15	3.04	189.76	107.93	12.15	3.04
BH-20A	1.00	28.00	25.50	22.50	400.13	205.84	12.49	3.12	200.13	116.83	12.49	3.12

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-20A	1.00	29.50	27.00	24.00	420.70	221.89	12.82	3.21	210.50	125.74	12.82	3.21
BH-20A	1.00	30.00	27.50	24.50	427.56	227.24	13.16	3.29	213.96	128.71	13.16	3.29
BH-20A	1.20	22.00	19.50	16.50	458.96	184.55	14.88	3.72	250.43	112.01	14.88	3.72
BH-20A	1.20	23.50	21.00	18.00	486.92	206.50	15.33	3.83	266.15	125.39	15.33	3.83
BH-20A	1.20	25.00	22.50	19.50	514.89	228.44	15.78	3.95	281.88	138.77	15.78	3.95
BH-20A	1.20	26.50	24.00	21.00	542.85	250.39	15.78	3.95	297.60	152.15	15.78	3.95
BH-20A	1.20	28.00	25.50	22.50	570.81	272.34	16.23	4.06	313.32	165.53	16.23	4.06
BH-20A	1.20	29.50	27.00	24.00	598.77	294.29	16.66	4.17	329.04	178.91	16.66	4.17
BH-20A	1.20	30.00	27.50	24.50	608.09	301.60	17.09	4.27	334.28	183.37	17.09	4.27

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-11	-
Chainage	1+610	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	201.89	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-11	1.00	22.00	19.50	18.00	320.58	146.42	11.13	2.78
BH-11	1.00	23.50	21.00	19.50	340.58	162.06	11.45	2.86
BH-11	1.00	25.00	22.50	21.00	360.58	177.71	11.72	2.93
BH-11	1.00	26.50	24.00	22.50	380.57	193.36	11.94	2.99
BH-11	1.00	28.00	25.50	24.00	400.57	209.01	12.13	3.03
BH-11	1.00	29.50	27.00	25.50	420.57	224.65	12.28	3.07
BH-11	1.00	30.00	27.50	26.00	427.23	229.87	12.41	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	38.25	51.00	4.71	7.26	38.93	46.19	18.48	8.08
3	5.50	7.00	1.50	Granular	17.00	0.02	26	-	11.90	13.19	1.00	-	6.25	7.00	63.75	76.50	4.71	13.68	87.52	108.46	43.39	13.56
4	7.00	8.50	1.50	Granular	17.00	0.02	26	-	11.90	13.19	1.00	-	7.75	8.50	89.25	102.00	4.71	19.15	114.04	154.13	61.65	20.57
5	8.50	10.00	1.50	Granular	19.10	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	116.33	130.65	4.71	25.92	170.05	236.07	94.43	29.48
6	10.00	11.50	1.50	Granular	19.10	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	144.98	159.30	4.71	32.31	205.06	303.39	121.36	40.18
7	11.50	13.00	1.50	Granular	19.10	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	173.63	187.95	4.71	41.56	311.44	451.33	180.53	53.46
8	13.00	14.50	1.50	Granular	9.29	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	194.92	201.89	4.71	46.66	326.75	513.31	205.32	68.18
9	14.50	16.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	15.25	16.00	201.89	201.89	4.71	49.99	364.93	601.48	240.59	83.83
10	16.00	17.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	16.75	17.50	201.89	201.89	4.71	49.99	364.93	651.47	260.59	99.47
11	17.50	19.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	18.25	19.00	201.89	201.89	4.71	49.99	364.93	701.47	280.59	115.12
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	201.89	201.89	4.71	49.99	364.93	751.46	300.58	130.77
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	201.89	201.89	4.71	49.99	364.93	801.45	320.58	146.42
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	201.89	201.89	4.71	49.99	364.93	851.45	340.58	162.06
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	201.89	201.89	4.71	49.99	364.93	901.44	360.58	177.71
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	201.89	201.89	4.71	49.99	364.93	951.43	380.57	193.36
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	201.89	201.89	4.71	49.99	364.93	1001.43	400.57	209.01
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	201.89	201.89	4.71	49.99	364.93	1051.42	420.57	224.65
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	201.89	201.89	1.57	16.66	364.93	1068.09	427.23	229.87

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.16E+03	3.41	1.17	2.00	1.83	6.80	6.23	0.180	0.719	11.13	2.78	37.84	17.33	26.71	6.68	90.81	41.58
2	22.50	23	2.96E+07	4.91E-02	3.30E+03	3.38	1.18	1.99	1.83	6.74	6.17	0.175	0.699	11.45	2.86	38.57	17.67	27.49	6.87	92.56	42.40
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.68	6.13	0.171	0.683	11.72	2.93	39.16	17.94	28.12	7.03	93.98	43.06
4	25.50	25	2.96E+07	4.91E-02	3.53E+03	3.33	1.20	1.99	1.83	6.64	6.09	0.167	0.670	11.94	2.99	39.66	18.18	28.66	7.17	95.18	43.63
5	27.00	25	2.96E+07	4.91E-02	3.61E+03	3.32	1.21	1.99	1.83	6.61	6.06	0.165	0.660	12.13	3.03	40.07	18.37	29.10	7.28	96.16	44.08
6	28.50	26	2.96E+07	4.91E-02	3.69E+03	3.30	1.21	1.99	1.83	6.58	6.03	0.163	0.651	12.28	3.07	40.41	18.53	29.48	7.37	96.99	44.47
7	30.00	26	2.96E+07	4.91E-02	3.75E+03	3.29	1.21	1.99	1.83	6.56	6.01	0.161	0.645	12.41	3.10	40.69	18.66	29.79	7.45	97.66	44.79

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-11	-
Chainage	1+610	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	232.47	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-11	1.20	22.00	19.50	18.00	466.33	191.68	14.48	3.62
BH-11	1.20	23.50	21.00	19.50	493.96	213.40	14.90	3.73
BH-11	1.20	25.00	22.50	21.00	521.59	235.12	15.24	3.81
BH-11	1.20	26.50	24.00	22.50	549.22	256.83	15.54	3.88
BH-11	1.20	28.00	25.50	24.00	576.86	278.55	15.78	3.94
BH-11	1.20	29.50	27.00	25.50	604.49	300.27	15.98	4.00
BH-11	1.20	30.00	27.50	26.00	613.70	307.51	16.15	4.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	38.25	51.00	5.65	8.71	57.22	65.93	26.37	11.15
3	5.50	7.00	1.50	Granular	17.00	0.02	26	-	11.90	13.19	1.00	-	6.25	7.00	63.75	76.50	5.65	16.42	128.32	153.46	61.38	18.12
4	7.00	8.50	1.50	Granular	17.00	0.02	26	-	11.90	13.19	1.00	-	7.75	8.50	89.25	102.00	5.65	22.98	166.51	214.62	85.85	26.93
5	8.50	10.00	1.50	Granular	19.10	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	116.33	130.65	5.65	31.11	247.86	327.09	130.84	38.02
6	10.00	11.50	1.50	Granular	19.10	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	144.98	159.30	5.65	38.77	298.28	416.28	166.51	51.25
7	11.50	13.00	1.50	Granular	19.10	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	173.63	187.95	5.65	49.87	452.29	620.16	248.06	67.59
8	13.00	14.50	1.50	Granular	9.29	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	194.92	201.89	5.65	55.99	472.38	696.24	278.50	85.64
9	14.50	16.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	15.25	16.00	209.54	217.18	5.65	62.26	566.70	852.83	341.13	105.45
10	16.00	17.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	16.75	17.50	224.83	232.47	5.65	66.81	605.65	958.58	383.43	126.53
11	17.50	19.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	18.25	19.00	232.47	232.47	5.65	69.08	605.65	1027.66	411.06	148.25
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	232.47	232.47	5.65	69.08	605.65	1096.74	438.70	169.97
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	232.47	232.47	5.65	69.08	605.65	1165.82	466.33	191.68
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	232.47	232.47	5.65	69.08	605.65	1234.90	493.96	213.40
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	232.47	232.47	5.65	69.08	605.65	1303.98	521.59	235.12
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	232.47	232.47	5.65	69.08	605.65	1373.06	549.22	256.83
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	232.47	232.47	5.65	69.08	605.65	1442.14	576.86	278.55
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	232.47	232.47	5.65	69.08	605.65	1511.22	604.49	300.27
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	232.47	232.47	1.88	23.03	605.65	1534.24	613.70	307.51

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.16E+03	3.94	1.01	2.01	1.83	7.94	7.23	0.138	0.552	14.48	3.62	57.51	26.17	34.76	8.69	138.02	62.81
2	22.50	23	2.96E+07	1.02E-01	3.30E+03	3.91	1.02	2.01	1.83	7.87	7.16	0.134	0.537	14.90	3.73	58.61	26.68	35.76	8.94	140.67	64.04
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.24	3.81	59.51	27.10	36.59	9.15	142.83	65.04
4	25.50	25	2.96E+07	1.02E-01	3.53E+03	3.86	1.04	2.01	1.83	7.76	7.07	0.129	0.515	15.54	3.88	60.27	27.45	37.29	9.32	144.64	65.88
5	27.00	25	2.96E+07	1.02E-01	3.61E+03	3.84	1.04	2.01	1.83	7.72	7.03	0.127	0.507	15.78	3.94	60.89	27.74	37.86	9.47	146.13	66.57
6	28.50	26	2.96E+07	1.02E-01	3.69E+03	3.82	1.05	2.01	1.83	7.69	7.00	0.125	0.501	15.98	4.00	61.41	27.98	38.35	9.59	147.39	67.16
7	30.00	26	2.96E+07	1.02E-01	3.75E+03	3.81	1.05	2.01	1.83	7.66	6.98	0.124	0.496	16.15	4.04	61.83	28.18	38.75	9.69	148.40	67.63

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-12	-
Chainage	1+745	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	195.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-12	1.00	22.00	19.50	15.00	301.60	136.40	11.04	2.76
BH-12	1.00	23.50	21.00	16.50	320.95	151.59	11.52	2.88
BH-12	1.00	25.00	22.50	18.00	340.29	166.78	11.91	2.98
BH-12	1.00	26.50	24.00	19.50	359.63	181.97	12.24	3.06
BH-12	1.00	28.00	25.50	21.00	378.98	197.16	12.52	3.13
BH-12	1.00	29.50	27.00	22.50	398.32	212.35	12.76	3.19
BH-12	1.00	30.00	27.50	23.00	404.77	217.41	12.95	3.24

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	21	-	2.00	6.49	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.50	0.03	21	-	2.00	6.49	1.00	-	4.75	5.50	37.88	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.50	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	64.13	77.25	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.50	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	90.38	103.50	4.71	17.90	85.32	103.22	41.29	14.36
5	8.50	10.00	1.50	Granular	16.40	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	115.80	128.10	4.71	26.76	190.04	234.71	93.88	23.50
6	10.00	11.50	1.50	Granular	16.40	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	140.40	152.70	4.71	32.45	224.58	301.70	120.68	34.24
7	11.50	13.00	1.50	Granular	19.10	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	167.03	181.35	4.71	39.98	300.97	418.07	167.23	47.08
8	13.00	14.50	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	188.32	195.29	4.71	45.08	316.28	478.46	191.38	61.35
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	195.29	195.29	4.71	46.75	316.91	525.83	210.33	76.09
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	195.29	195.29	4.71	46.75	316.91	572.58	229.03	90.83
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	195.29	195.29	4.71	48.36	353.26	657.29	262.92	106.02
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	195.29	195.29	4.71	48.36	353.26	705.65	282.26	121.21
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	195.29	195.29	4.71	48.36	353.26	754.01	301.60	136.40
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	195.29	195.29	4.71	48.36	353.26	802.37	320.95	151.59
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	195.29	195.29	4.71	48.36	353.26	850.73	340.29	166.78
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	195.29	195.29	4.71	48.36	353.26	899.09	359.63	181.97
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	195.29	195.29	4.71	48.36	353.26	947.45	378.98	197.16
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	195.29	195.29	4.71	48.36	353.26	995.80	398.32	212.35
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	195.29	195.29	1.57	16.12	353.26	1011.92	404.77	217.41

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.61E+03	3.54	1.98	1.93	1.80	6.82	6.39	0.181	0.724	11.04	2.76	37.64	17.63	26.51	6.63	90.35	42.32
2	22.50	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.174	0.694	11.52	2.88	38.72	18.15	27.65	6.91	92.92	43.55
3	24.00	21	2.96E+07	4.91E-02	2.94E+03	3.46	2.03	1.92	1.80	6.65	6.23	0.168	0.672	11.91	2.98	39.59	18.56	28.59	7.15	95.01	44.55
4	25.50	22	2.96E+07	4.91E-02	3.07E+03	3.43	2.04	1.92	1.80	6.59	6.18	0.163	0.653	12.24	3.06	40.32	18.91	29.38	7.35	96.77	45.39
5	27.00	22	2.96E+07	4.91E-02	3.18E+03	3.40	2.06	1.92	1.80	6.54	6.13	0.160	0.639	12.52	3.13	40.92	19.20	30.05	7.51	98.22	46.08
6	28.50	23	2.96E+07	4.91E-02	3.28E+03	3.38	2.07	1.92	1.80	6.50	6.10	0.157	0.627	12.76	3.19	41.44	19.45	30.61	7.65	99.46	46.67
7	30.00	24	2.96E+07	4.91E-02	3.36E+03	3.37	2.08	1.92	1.80	6.46	6.07	0.154	0.618	12.95	3.24	41.86	19.65	31.08	7.77	100.47	47.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-12	-
Chainage	1+745	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	225.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-12	1.20	22.00	19.50	15.00	442.31	179.58	14.37	3.59
BH-12	1.20	23.50	21.00	16.50	469.16	200.75	14.99	3.75
BH-12	1.20	25.00	22.50	18.00	496.01	221.91	15.50	3.87
BH-12	1.20	26.50	24.00	19.50	522.85	243.08	15.93	3.98
BH-12	1.20	28.00	25.50	21.00	549.70	264.25	16.29	4.07
BH-12	1.20	29.50	27.00	22.50	576.55	285.42	16.60	4.15
BH-12	1.20	30.00	27.50	23.00	585.50	292.48	16.86	4.21

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	21	-	2.00	6.49	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.50	0.03	21	-	2.00	6.49	1.00	-	4.75	5.50	37.88	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.50	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	64.13	77.25	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.50	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	90.38	103.50	5.65	21.48	124.45	145.93	58.37	19.47
5	8.50	10.00	1.50	Granular	16.40	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	115.80	128.10	5.65	32.12	276.58	330.18	132.07	30.84
6	10.00	11.50	1.50	Granular	16.40	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	140.40	152.70	5.65	38.94	326.32	418.86	167.55	44.12
7	11.50	13.00	1.50	Granular	19.10	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	167.03	181.35	5.65	47.98	437.21	577.73	231.09	59.93
8	13.00	14.50	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	188.32	195.29	5.65	54.09	457.30	651.91	260.77	77.45
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	202.94	210.58	5.65	58.29	493.31	746.22	298.49	96.15
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	218.23	225.87	5.65	62.68	528.24	843.83	337.53	116.07
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	225.87	225.87	5.65	67.12	588.84	971.55	388.62	137.24
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	225.87	225.87	5.65	67.12	588.84	1038.66	415.47	158.41
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	225.87	225.87	5.65	67.12	588.84	1105.78	442.31	179.58
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	225.87	225.87	5.65	67.12	588.84	1172.90	469.16	200.75
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	225.87	225.87	5.65	67.12	588.84	1240.02	496.01	221.91
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	225.87	225.87	5.65	67.12	588.84	1307.14	522.85	243.08
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	225.87	225.87	5.65	67.12	588.84	1374.25	549.70	264.25
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	225.87	225.87	5.65	67.12	588.84	1441.37	576.55	285.42
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	225.87	225.87	1.88	22.37	588.84	1463.75	585.50	292.48

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.61E+03	4.09	1.71	1.94	1.81	7.96	7.42	0.139	0.557	14.37	3.59	57.20	26.63	34.48	8.62	137.28	63.92
2	22.50	20	2.96E+07	1.02E-01	2.79E+03	4.04	1.73	1.94	1.81	7.85	7.32	0.133	0.534	14.99	3.75	58.84	27.41	35.97	8.99	141.21	65.78
3	24.00	21	2.96E+07	1.02E-01	2.94E+03	4.00	1.75	1.94	1.81	7.76	7.24	0.129	0.516	15.50	3.87	60.17	28.04	37.19	9.30	144.40	67.30
4	25.50	22	2.96E+07	1.02E-01	3.07E+03	3.96	1.77	1.94	1.81	7.69	7.17	0.126	0.502	15.93	3.98	61.28	28.57	38.23	9.56	147.08	68.58
5	27.00	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.78	1.94	1.81	7.64	7.12	0.123	0.491	16.29	4.07	62.21	29.01	39.10	9.78	149.30	69.63
6	28.50	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.79	1.94	1.81	7.59	7.08	0.120	0.482	16.60	4.15	62.99	29.39	39.84	9.96	151.18	70.53
7	30.00	24	2.96E+07	1.02E-01	3.36E+03	3.90	1.80	1.94	1.81	7.55	7.05	0.119	0.475	16.86	4.21	63.64	29.69	40.46	10.11	152.73	71.26

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-13	-
Chainage	1+859	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	208.04	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-13	1.00	22.00	19.50	18.00	328.52	148.93	11.19	2.80
BH-13	1.00	23.50	21.00	19.50	349.13	165.00	11.50	2.88
BH-13	1.00	25.00	22.50	21.00	369.73	181.08	11.76	2.94
BH-13	1.00	26.50	24.00	22.50	390.34	197.15	11.98	2.99
BH-13	1.00	28.00	25.50	24.00	410.95	213.22	12.16	3.04
BH-13	1.00	29.50	27.00	25.50	431.55	229.30	12.31	3.08
BH-13	1.00	30.00	27.50	26.00	438.42	234.66	12.43	3.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	18.00	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	39.00	52.50	4.71	8.05	52.12	60.17	24.07	8.30
3	5.50	7.00	1.50	Granular	18.00	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	66.00	79.50	4.71	14.16	91.11	113.32	45.33	13.92
4	7.00	8.50	1.50	Granular	19.10	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	93.83	108.15	4.71	20.14	121.42	163.76	65.51	21.20
5	8.50	10.00	1.50	Granular	19.10	0.04	27	-	13.80	15.50	1.00	-	9.25	10.00	122.48	136.80	4.71	27.30	177.57	247.21	98.88	30.50
6	10.00	11.50	1.50	Granular	19.10	0.04	27	-	13.80	15.50	1.00	-	10.75	11.50	151.13	165.45	4.71	33.68	212.58	315.90	126.36	41.58
7	11.50	13.00	1.50	Granular	19.10	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	179.78	194.10	4.71	41.55	284.39	429.27	171.71	54.86
8	13.00	14.50	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	201.07	208.04	4.71	46.47	297.90	489.25	195.70	69.52
9	14.50	16.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	208.04	208.04	4.71	49.80	337.13	578.28	231.31	85.11
10	16.00	17.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	208.04	208.04	4.71	49.80	337.13	628.08	251.23	100.71
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	208.04	208.04	4.71	51.52	375.81	718.27	287.31	116.78
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	208.04	208.04	4.71	51.52	375.81	769.79	307.91	132.85
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	208.04	208.04	4.71	51.52	375.81	821.30	328.52	148.93
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	208.04	208.04	4.71	51.52	375.81	872.82	349.13	165.00
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	208.04	208.04	4.71	51.52	375.81	924.34	369.73	181.08
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	208.04	208.04	4.71	51.52	375.81	975.85	390.34	197.15
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	208.04	208.04	4.71	51.52	375.81	1027.37	410.95	213.22
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	208.04	208.04	4.71	51.52	375.81	1078.89	431.55	229.30
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	208.04	208.04	1.57	17.17	375.81	1096.06	438.42	234.66

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.18	1.99	1.83	6.79	6.22	0.179	0.715	11.19	2.80	37.97	17.39	26.86	6.71	91.14	41.74
2	22.50	23	2.96E+07	4.91E-02	3.33E+03	3.37	1.19	1.99	1.83	6.73	6.16	0.174	0.695	11.50	2.88	38.68	17.72	27.61	6.90	92.84	42.53
3	24.00	24	2.96E+07	4.91E-02	3.44E+03	3.35	1.19	1.99	1.83	6.68	6.12	0.170	0.680	11.76	2.94	39.25	17.99	28.22	7.06	94.21	43.17
4	25.50	25	2.96E+07	4.91E-02	3.54E+03	3.33	1.20	1.99	1.83	6.64	6.08	0.167	0.668	11.98	2.99	39.74	18.21	28.75	7.19	95.37	43.72
5	27.00	25	2.96E+07	4.91E-02	3.63E+03	3.32	1.21	1.99	1.83	6.60	6.05	0.165	0.658	12.16	3.04	40.13	18.40	29.18	7.29	96.32	44.16
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.58	6.03	0.162	0.650	12.31	3.08	40.47	18.56	29.54	7.39	97.12	44.53
7	30.00	26	2.96E+07	4.91E-02	3.75E+03	3.29	1.21	1.99	1.83	6.55	6.01	0.161	0.644	12.43	3.11	40.73	18.68	29.83	7.46	97.75	44.83

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-13	-
Chainage	1+859	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	238.62	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-13	1.20	22.00	19.50	18.00	476.78	194.61	14.56	3.64
BH-13	1.20	23.50	21.00	19.50	505.14	216.84	14.97	3.74
BH-13	1.20	25.00	22.50	21.00	533.51	239.07	15.30	3.83
BH-13	1.20	26.50	24.00	22.50	561.87	261.30	15.58	3.90
BH-13	1.20	28.00	25.50	24.00	590.23	283.53	15.81	3.95
BH-13	1.20	29.50	27.00	25.50	618.59	305.76	16.01	4.00
BH-13	1.20	30.00	27.50	26.00	628.05	313.17	16.17	4.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	18.00	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	39.00	52.50	5.65	9.66	77.09	86.75	34.70	11.41
3	5.50	7.00	1.50	Granular	18.00	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	66.00	79.50	5.65	17.00	133.63	160.28	64.11	18.55
4	7.00	8.50	1.50	Granular	19.10	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	93.83	108.15	5.65	24.16	177.42	228.24	91.29	27.69
5	8.50	10.00	1.50	Granular	19.10	0.04	27	-	13.80	15.50	1.00	-	9.25	10.00	122.48	136.80	5.65	32.75	258.69	342.26	136.90	39.23
6	10.00	11.50	1.50	Granular	19.10	0.04	27	-	13.80	15.50	1.00	-	10.75	11.50	151.13	165.45	5.65	40.42	309.11	433.09	173.24	52.93
7	11.50	13.00	1.50	Granular	19.10	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	179.78	194.10	5.65	49.86	412.93	586.78	234.71	69.26
8	13.00	14.50	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	201.07	208.04	5.65	55.77	430.63	660.25	264.10	87.25
9	14.50	16.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	215.69	223.33	5.65	61.96	522.44	814.01	325.60	106.97
10	16.00	17.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	230.98	238.62	5.65	66.35	557.37	915.29	366.12	127.93
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	238.62	238.62	5.65	70.91	621.31	1050.14	420.05	150.15
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	238.62	238.62	5.65	70.91	621.31	1121.04	448.42	172.38
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	238.62	238.62	5.65	70.91	621.31	1191.95	476.78	194.61
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	238.62	238.62	5.65	70.91	621.31	1262.86	505.14	216.84
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	238.62	238.62	5.65	70.91	621.31	1333.76	533.51	239.07
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	238.62	238.62	5.65	70.91	621.31	1404.67	561.87	261.30
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	238.62	238.62	5.65	70.91	621.31	1475.58	590.23	283.53
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	238.62	238.62	5.65	70.91	621.31	1546.48	618.59	305.76
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	238.62	238.62	1.88	23.64	621.31	1570.12	628.05	313.17

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.02	2.01	1.83	7.93	7.22	0.137	0.549	14.56	3.64	57.72	26.27	34.95	8.74	138.52	63.04
2	22.50	23	2.96E+07	1.02E-01	3.33E+03	3.90	1.02	2.01	1.83	7.86	7.15	0.134	0.534	14.97	3.74	58.79	26.76	35.92	8.98	141.09	64.23
3	24.00	24	2.96E+07	1.02E-01	3.44E+03	3.88	1.03	2.01	1.83	7.80	7.10	0.131	0.523	15.30	3.83	59.66	27.17	36.72	9.18	143.17	65.20
4	25.50	25	2.96E+07	1.02E-01	3.54E+03	3.85	1.04	2.01	1.83	7.75	7.06	0.128	0.513	15.58	3.90	60.39	27.51	37.40	9.35	144.93	66.02
5	27.00	25	2.96E+07	1.02E-01	3.63E+03	3.84	1.04	2.01	1.83	7.71	7.03	0.126	0.506	15.81	3.95	60.99	27.78	37.96	9.49	146.36	66.68
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.500	16.01	4.00	61.49	28.02	38.43	9.61	147.58	67.25
7	30.00	26	2.96E+07	1.02E-01	3.75E+03	3.81	1.05	2.01	1.83	7.66	6.98	0.124	0.495	16.17	4.04	61.89	28.21	38.81	9.70	148.54	67.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-14	-
Chainage	1+952	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	202.72	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-14	1.00	22.00	19.50	15.00	294.87	128.01	10.83	2.71
BH-14	1.00	23.50	21.00	16.50	314.95	143.71	11.24	2.81
BH-14	1.00	25.00	22.50	18.00	335.02	159.42	11.66	2.91
BH-14	1.00	26.50	24.00	19.50	355.10	175.12	12.01	3.00
BH-14	1.00	28.00	25.50	21.00	375.18	190.83	12.30	3.08
BH-14	1.00	29.50	27.00	22.50	395.26	206.53	12.56	3.14
BH-14	1.00	30.00	27.50	23.00	401.96	211.77	12.76	3.19

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.05	26	-	11.90	13.19	1.00	-	3.25	4.00	13.50	27.00	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.75	0.05	26	-	11.90	13.19	1.00	-	4.75	5.50	40.31	53.63	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.94	80.25	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	93.56	106.88	4.71	20.08	119.46	139.54	55.81	14.97
5	8.50	10.00	1.50	Granular	17.75	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	120.19	133.50	4.71	0.00	121.48	141.56	56.63	16.62
6	10.00	11.50	1.50	Granular	17.75	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	146.81	160.13	4.71	30.30	144.32	194.69	77.88	26.75
7	11.50	13.00	1.50	Granular	19.10	0.04	26	-	11.90	13.19	1.00	-	12.25	13.00	174.45	188.78	4.71	37.44	205.25	293.07	117.23	38.88
8	13.00	14.50	1.50	Granular	9.29	0.04	26	-	11.90	13.19	1.00	-	13.75	14.50	195.75	202.72	4.71	42.01	215.15	344.97	137.99	52.29
9	14.50	16.00	1.50	Granular	10.19	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	202.72	202.72	4.71	46.85	290.98	467.66	187.06	67.06
10	16.00	17.50	1.50	Granular	10.19	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	202.72	202.72	4.71	46.85	290.98	514.51	205.80	81.83
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	202.72	202.72	4.71	48.52	328.69	600.74	240.29	97.07
12	19.00	20.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	202.72	202.72	4.71	48.52	328.69	649.26	259.70	112.30
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	202.72	202.72	4.71	50.20	366.39	737.17	294.87	128.01
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	202.72	202.72	4.71	50.20	366.39	787.36	314.95	143.71
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	202.72	202.72	4.71	50.20	366.39	837.56	335.02	159.42
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	202.72	202.72	4.71	50.20	366.39	887.76	355.10	175.12
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	202.72	202.72	4.71	50.20	366.39	937.96	375.18	190.83
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	202.72	202.72	4.71	50.20	366.39	988.16	395.26	206.53
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	202.72	202.72	1.57	16.73	366.39	1004.89	401.96	211.77

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.54E+03	3.56	1.97	1.93	1.80	6.86	6.43	0.185	0.738	10.83	2.71	37.17	17.41	26.00	6.50	89.20	41.77
2	22.50	19	2.96E+07	4.91E-02	2.69E+03	3.52	1.99	1.93	1.80	6.78	6.35	0.178	0.712	11.24	2.81	38.09	17.85	26.98	6.75	91.42	42.84
3	24.00	20	2.96E+07	4.91E-02	2.85E+03	3.48	2.01	1.92	1.80	6.70	6.28	0.172	0.686	11.66	2.91	39.02	18.29	27.98	6.99	93.66	43.90
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.167	0.666	12.01	3.00	39.81	18.67	28.82	7.21	95.54	44.80
5	27.00	22	2.96E+07	4.91E-02	3.10E+03	3.42	2.05	1.92	1.80	6.58	6.17	0.163	0.650	12.30	3.08	40.45	18.98	29.53	7.38	97.09	45.54
6	28.50	22	2.96E+07	4.91E-02	3.20E+03	3.40	2.06	1.92	1.80	6.53	6.13	0.159	0.637	12.56	3.14	41.00	19.24	30.13	7.53	98.41	46.17
7	30.00	23	2.96E+07	4.91E-02	3.28E+03	3.38	2.07	1.92	1.80	6.50	6.10	0.157	0.627	12.76	3.19	41.46	19.46	30.63	7.66	99.50	46.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-14	-
Chainage	1+952	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	233.30	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-14	1.20	22.00	19.50	15.00	435.13	169.25	14.09	3.52
BH-14	1.20	23.50	21.00	16.50	462.86	191.04	14.62	3.66
BH-14	1.20	25.00	22.50	18.00	490.59	212.82	15.17	3.79
BH-14	1.20	26.50	24.00	19.50	518.31	234.61	15.63	3.91
BH-14	1.20	28.00	25.50	21.00	546.04	256.40	16.01	4.00
BH-14	1.20	29.50	27.00	22.50	573.77	278.18	16.34	4.09
BH-14	1.20	30.00	27.50	23.00	583.02	285.44	16.61	4.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.05	26	-	11.90	13.19	1.00	-	3.25	4.00	13.50	27.00	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.75	0.05	26	-	11.90	13.19	1.00	-	4.75	5.50	40.31	53.63	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.94	80.25	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	93.56	106.88	5.65	24.10	174.41	198.51	79.40	20.21
5	8.50	10.00	1.50	Granular	17.75	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	120.19	133.50	5.65	0.00	176.95	201.05	80.42	22.58
6	10.00	11.50	1.50	Granular	17.75	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	146.81	160.13	5.65	36.35	209.83	270.28	108.11	35.13
7	11.50	13.00	1.50	Granular	19.10	0.04	26	-	11.90	13.19	1.00	-	12.25	13.00	174.45	188.78	5.65	44.93	298.14	403.52	161.41	50.09
8	13.00	14.50	1.50	Granular	9.29	0.04	26	-	11.90	13.19	1.00	-	13.75	14.50	195.75	202.72	5.65	50.41	311.07	466.86	186.74	66.58
9	14.50	16.00	1.50	Granular	10.19	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	210.36	218.01	5.65	58.34	451.75	665.88	266.35	85.29
10	16.00	17.50	1.50	Granular	10.19	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	225.65	233.30	5.65	62.58	482.67	759.38	303.75	105.19
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	233.30	233.30	5.65	67.01	545.21	888.93	355.57	126.33
12	19.00	20.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	233.30	233.30	5.65	67.01	545.21	955.95	382.38	147.47
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	233.30	233.30	5.65	69.32	607.75	1087.81	435.13	169.25
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	233.30	233.30	5.65	69.32	607.75	1157.14	462.86	191.04
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	233.30	233.30	5.65	69.32	607.75	1226.46	490.59	212.82
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	233.30	233.30	5.65	69.32	607.75	1295.79	518.31	234.61
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	233.30	233.30	5.65	69.32	607.75	1365.11	546.04	256.40
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	233.30	233.30	5.65	69.32	607.75	1434.44	573.77	278.18
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	233.30	233.30	1.88	23.11	607.75	1457.54	583.02	285.44

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.54E+03	4.12	1.70	1.95	1.81	8.02	7.46	0.142	0.568	14.09	3.52	56.47	26.28	33.82	8.45	135.53	63.08
2	22.50	19	2.96E+07	1.02E-01	2.69E+03	4.07	1.72	1.94	1.81	7.92	7.37	0.137	0.547	14.62	3.66	57.88	26.96	35.10	8.77	138.92	64.70
3	24.00	20	2.96E+07	1.02E-01	2.85E+03	4.03	1.74	1.94	1.81	7.82	7.29	0.132	0.528	15.17	3.79	59.30	27.63	36.40	9.10	142.33	66.32
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.75	1.94	1.81	7.74	7.22	0.128	0.512	15.63	3.91	60.50	28.20	37.50	9.38	145.20	67.68
5	27.00	22	2.96E+07	1.02E-01	3.10E+03	3.96	1.77	1.94	1.81	7.68	7.16	0.125	0.500	16.01	4.00	61.49	28.67	38.42	9.61	147.57	68.81
6	28.50	22	2.96E+07	1.02E-01	3.20E+03	3.93	1.78	1.94	1.81	7.63	7.12	0.122	0.490	16.34	4.09	62.33	29.07	39.22	9.80	149.59	69.77
7	30.00	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.79	1.94	1.81	7.59	7.08	0.120	0.482	16.61	4.15	63.02	29.40	39.87	9.97	151.25	70.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-15	-
Chainage	2+035	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	204.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-15	1.00	22.00	19.50	18.00	324.19	147.42	10.35	2.59
BH-15	1.00	23.50	21.00	19.50	344.49	163.28	10.53	2.63
BH-15	1.00	25.00	22.50	21.00	364.80	179.14	10.73	2.68
BH-15	1.00	26.50	24.00	22.50	385.10	195.00	10.95	2.74
BH-15	1.00	28.00	25.50	24.00	405.40	210.86	11.20	2.80
BH-15	1.00	29.50	27.00	25.50	425.70	226.72	11.41	2.85
BH-15	1.00	30.00	27.50	26.00	432.47	232.01	11.59	2.90

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.07	24	-	8.00	9.78	1.00	-	3.25	4.00	12.60	25.20	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.75	0.07	24	-	8.00	9.78	1.00	-	4.75	5.50	38.51	51.83	4.71	7.63	45.56	53.19	21.27	8.18
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	65.14	78.45	4.71	13.98	89.90	111.51	44.60	13.75
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	91.76	105.08	4.71	19.69	117.58	158.89	63.55	20.91
5	8.50	10.00	1.50	Granular	19.10	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	119.40	133.73	4.71	27.60	199.61	268.51	107.40	30.29
6	10.00	11.50	1.50	Granular	19.10	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	148.05	162.38	4.71	34.22	239.84	342.96	137.18	41.52
7	11.50	13.00	1.50	Granular	19.10	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	176.70	191.03	4.71	40.84	280.08	424.03	169.61	54.60
8	13.00	14.50	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	198.00	204.97	4.71	45.76	293.58	483.30	193.32	69.06
9	14.50	16.00	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	204.97	204.97	4.71	49.06	331.63	570.41	228.16	84.45
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	204.97	204.97	4.71	49.06	332.26	620.10	248.04	99.84
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	204.97	204.97	4.71	50.76	370.37	708.97	283.59	115.70
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	204.97	204.97	4.71	50.76	370.37	759.72	303.89	131.56
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	204.97	204.97	4.71	50.76	370.37	810.48	324.19	147.42
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	204.97	204.97	4.71	50.76	370.37	861.23	344.49	163.28
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	204.97	204.97	4.71	50.76	370.37	911.99	364.80	179.14
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	204.97	204.97	4.71	50.76	370.37	962.74	385.10	195.00
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	204.97	204.97	4.71	50.76	370.37	1013.50	405.40	210.86
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	204.97	204.97	4.71	50.76	370.37	1064.25	425.70	226.72
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	204.97	204.97	1.57	16.92	370.37	1081.17	432.47	232.01

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.15	2.00	1.83	6.97	6.37	0.193	0.773	10.35	2.59	36.06	16.49	24.85	6.21	86.53	39.59
2	22.50	20	2.96E+07	4.91E-02	2.90E+03	3.47	1.15	2.00	1.83	6.93	6.34	0.190	0.760	10.53	2.63	36.46	16.68	25.26	6.32	87.50	40.04
3	24.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.746	10.73	2.68	36.92	16.90	25.74	6.44	88.60	40.55
4	25.50	22	2.96E+07	4.91E-02	3.08E+03	3.42	1.17	2.00	1.83	6.84	6.26	0.183	0.730	10.95	2.74	37.44	17.14	26.29	6.57	89.86	41.14
5	27.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.18	1.99	1.83	6.78	6.21	0.179	0.714	11.20	2.80	38.00	17.40	26.88	6.72	91.21	41.77
6	28.50	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.18	1.99	1.83	6.74	6.18	0.175	0.701	11.41	2.85	38.48	17.63	27.40	6.85	92.36	42.31
7	30.00	24	2.96E+07	4.91E-02	3.37E+03	3.37	1.19	1.99	1.83	6.71	6.15	0.173	0.690	11.59	2.90	38.87	17.81	27.82	6.95	93.30	42.75

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-15	-
Chainage	2+035	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	234.20	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-15	1.20	22.00	19.50	18.00	468.97	192.30	13.47	3.37
BH-15	1.20	23.50	21.00	19.50	496.81	214.16	13.70	3.43
BH-15	1.20	25.00	22.50	21.00	524.65	236.02	13.96	3.49
BH-15	1.20	26.50	24.00	22.50	552.48	257.88	14.26	3.56
BH-15	1.20	28.00	25.50	24.00	580.32	279.75	14.58	3.64
BH-15	1.20	29.50	27.00	25.50	608.16	301.61	14.85	3.71
BH-15	1.20	30.00	27.50	26.00	617.43	308.89	15.08	3.77

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.07	24	-	8.00	9.78	1.00	-	3.25	4.00	12.60	25.20	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.75	0.07	24	-	8.00	9.78	1.00	-	4.75	5.50	38.51	51.83	5.65	9.16	67.21	76.37	30.55	11.27
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	65.14	78.45	5.65	16.78	131.85	157.78	63.11	18.34
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	91.76	105.08	5.65	23.63	171.72	221.28	88.51	27.34
5	8.50	10.00	1.50	Granular	19.10	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	119.40	133.73	5.65	33.11	290.84	373.52	149.41	38.98
6	10.00	11.50	1.50	Granular	19.10	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	148.05	162.38	5.65	41.06	348.78	472.51	189.01	52.86
7	11.50	13.00	1.50	Granular	19.10	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	176.70	191.03	5.65	49.01	406.71	579.46	231.78	68.95
8	13.00	14.50	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	198.00	204.97	5.65	54.91	424.42	652.07	260.83	86.70
9	14.50	16.00	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	211.94	218.91	5.65	60.88	511.25	799.79	319.92	106.12
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	226.55	234.20	5.65	65.08	547.26	900.88	360.35	126.72
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	234.20	234.20	5.65	69.59	610.04	1033.24	413.30	148.58
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	234.20	234.20	5.65	69.59	610.04	1102.84	441.13	170.44
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	234.20	234.20	5.65	69.59	610.04	1172.43	468.97	192.30
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	234.20	234.20	5.65	69.59	610.04	1242.02	496.81	214.16
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	234.20	234.20	5.65	69.59	610.04	1311.61	524.65	236.02
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	234.20	234.20	5.65	69.59	610.04	1381.20	552.48	257.88
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	234.20	234.20	5.65	69.59	610.04	1450.80	580.32	279.75
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	234.20	234.20	5.65	69.59	610.04	1520.39	608.16	301.61
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	234.20	234.20	1.88	23.20	610.04	1543.59	617.43	308.89

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.82E+03	4.03	0.99	2.02	1.83	8.14	7.40	0.148	0.594	13.47	3.37	54.81	24.92	32.34	8.08	131.54	59.80
2	22.50	20	2.96E+07	1.02E-01	2.90E+03	4.01	1.00	2.02	1.83	8.09	7.36	0.146	0.584	13.70	3.43	55.42	25.20	32.88	8.22	133.01	60.49
3	24.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.96	3.49	56.12	25.52	33.50	8.38	134.68	61.26
4	25.50	22	2.96E+07	1.02E-01	3.08E+03	3.96	1.01	2.01	1.83	7.98	7.27	0.140	0.561	14.26	3.56	56.91	25.89	34.21	8.55	136.58	62.14
5	27.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.02	2.01	1.83	7.93	7.21	0.137	0.549	14.58	3.64	57.76	26.29	34.98	8.75	138.62	63.09
6	28.50	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.02	2.01	1.83	7.88	7.17	0.135	0.539	14.85	3.71	58.49	26.62	35.65	8.91	140.37	63.90
7	30.00	24	2.96E+07	1.02E-01	3.37E+03	3.89	1.03	2.01	1.83	7.84	7.14	0.133	0.531	15.08	3.77	59.08	26.90	36.19	9.05	141.80	64.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-16	-
Chainage	2+135	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	206.17	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-16	1.00	22.00	19.50	15.00	276.91	135.39	11.00	2.75
BH-16	1.00	23.50	21.00	16.50	295.97	150.38	11.27	2.82
BH-16	1.00	25.00	22.50	18.00	315.03	165.37	11.67	2.92
BH-16	1.00	26.50	24.00	19.50	334.36	180.36	12.01	3.00
BH-16	1.00	28.00	25.50	21.00	385.45	196.30	12.28	3.07
BH-16	1.00	29.50	27.00	22.50	405.87	212.25	12.52	3.13
BH-16	1.00	30.00	27.50	23.00	412.68	217.56	12.72	3.18

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	13.31	26.63	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	39.94	53.25	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.75	0.05	23	-	6.00	8.68	1.00	-	6.25	7.00	66.56	79.88	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.75	0.05	23	-	6.00	8.68	1.00	-	7.75	8.50	93.19	106.50	4.71	17.69	77.10	94.79	37.92	14.30
5	8.50	10.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	119.81	133.13	4.71	25.71	146.75	190.16	76.06	23.15
6	10.00	11.50	1.50	Granular	19.50	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	147.75	162.38	4.71	31.71	177.99	253.10	101.24	33.68
7	11.50	13.00	1.50	Granular	19.50	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	177.00	191.63	4.71	39.45	244.78	359.34	143.74	46.37
8	13.00	14.50	1.50	Granular	9.69	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	198.90	206.17	4.71	44.33	257.22	416.11	166.44	60.43
9	14.50	16.00	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	206.17	206.17	4.71	47.65	295.52	502.05	200.82	75.42
10	16.00	17.50	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	206.17	206.17	4.71	47.65	295.52	549.70	219.88	90.41
11	17.50	19.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	18.25	19.00	206.17	206.17	4.71	47.65	295.52	597.35	238.94	105.41
12	19.00	20.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	19.75	20.50	206.17	206.17	4.71	47.65	295.52	645.00	258.00	120.40
13	20.50	22.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	206.17	206.17	4.71	47.65	295.14	692.28	276.91	135.39
14	22.00	23.50	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	206.17	206.17	4.71	47.65	295.14	739.93	295.97	150.38
15	23.50	25.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	206.17	206.17	4.71	47.65	295.14	787.57	315.03	165.37
16	25.00	26.50	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	25.75	26.50	206.17	206.17	4.71	47.65	295.83	835.90	334.36	180.36
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	206.17	206.17	4.71	51.05	372.49	963.62	385.45	196.30
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	206.17	206.17	4.71	51.05	372.49	1014.68	405.87	212.25
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	206.17	206.17	1.57	17.02	372.49	1031.69	412.68	217.56

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.60E+03	3.54	1.98	1.93	1.80	6.83	6.39	0.182	0.727	11.00	2.75	37.55	17.59	26.40	6.60	90.11	42.21
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.99	1.93	1.80	6.77	6.35	0.177	0.710	11.27	2.82	38.16	17.88	27.05	6.76	91.58	42.91
3	24.00	20	2.96E+07	4.91E-02	2.85E+03	3.48	2.01	1.92	1.80	6.69	6.28	0.171	0.686	11.67	2.92	39.05	18.30	28.00	7.00	93.72	43.93
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.167	0.666	12.01	3.00	39.80	18.66	28.81	7.20	95.51	44.79
5	27.00	22	2.96E+07	4.91E-02	3.09E+03	3.42	2.04	1.92	1.80	6.58	6.17	0.163	0.651	12.28	3.07	40.41	18.96	29.48	7.37	96.99	45.49
6	28.50	22	2.96E+07	4.91E-02	3.18E+03	3.40	2.06	1.92	1.80	6.54	6.13	0.160	0.639	12.52	3.13	40.94	19.21	30.06	7.51	98.24	46.09
7	30.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	2.07	1.92	1.80	6.50	6.10	0.157	0.629	12.72	3.18	41.36	19.41	30.52	7.63	99.26	46.58

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-16	-
Chainage	2+135	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-16	1.20	22.00	19.50	15.00	397.70	177.30	14.31	3.58
BH-16	1.20	23.50	21.00	16.50	423.80	197.95	14.66	3.67
BH-16	1.20	25.00	22.50	18.00	449.90	218.59	15.18	3.80
BH-16	1.20	26.50	24.00	19.50	476.46	239.23	15.62	3.91
BH-16	1.20	28.00	25.50	21.00	554.87	261.18	15.99	4.00
BH-16	1.20	29.50	27.00	22.50	582.83	283.13	16.30	4.07
BH-16	1.20	30.00	27.50	23.00	592.15	290.45	16.55	4.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	13.31	26.63	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	39.94	53.25	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.75	0.05	23	-	6.00	8.68	1.00	-	6.25	7.00	66.56	79.88	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.75	0.05	23	-	6.00	8.68	1.00	-	7.75	8.50	93.19	106.50	5.65	21.23	112.23	133.46	53.38	19.40
5	8.50	10.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	119.81	133.13	5.65	30.86	213.72	265.81	106.32	30.42
6	10.00	11.50	1.50	Granular	19.50	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	147.75	162.38	5.65	38.05	258.94	349.07	139.63	43.45
7	11.50	13.00	1.50	Granular	19.50	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	177.00	191.63	5.65	47.34	355.54	493.02	197.21	59.08
8	13.00	14.50	1.50	Granular	9.69	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	198.90	206.17	5.65	53.19	371.91	562.58	225.03	76.34
9	14.50	16.00	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	213.44	220.71	5.65	59.19	456.67	706.53	282.61	95.29
10	16.00	17.50	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	227.98	235.25	5.65	63.23	486.08	799.16	319.67	115.37
11	17.50	19.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	18.25	19.00	235.25	235.25	5.65	65.24	486.08	864.41	345.76	136.02
12	19.00	20.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	19.75	20.50	235.25	235.25	5.65	65.24	486.08	929.65	371.86	156.66
13	20.50	22.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	235.25	235.25	5.65	65.24	485.43	994.25	397.70	177.30
14	22.00	23.50	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	235.25	235.25	5.65	65.24	485.43	1059.50	423.80	197.95
15	23.50	25.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	235.25	235.25	5.65	65.24	485.43	1124.74	449.90	218.59
16	25.00	26.50	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	25.75	26.50	235.25	235.25	5.65	65.24	486.61	1191.16	476.46	239.23
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	235.25	235.25	5.65	69.90	612.72	1387.17	554.87	261.18
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	235.25	235.25	5.65	69.90	612.72	1457.07	582.83	283.13
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	235.25	235.25	1.88	23.30	612.72	1480.37	592.15	290.45

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.60E+03	4.10	1.71	1.94	1.81	7.97	7.43	0.140	0.559	14.31	3.58	57.05	26.56	34.34	8.59	136.92	63.75
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.72	1.94	1.81	7.91	7.37	0.136	0.546	14.66	3.67	57.98	27.01	35.19	8.80	139.16	64.81
3	24.00	20	2.96E+07	1.02E-01	2.85E+03	4.03	1.74	1.94	1.81	7.82	7.29	0.132	0.527	15.18	3.80	59.34	27.65	36.43	9.11	142.42	66.36
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.75	1.94	1.81	7.74	7.22	0.128	0.512	15.62	3.91	60.49	28.19	37.49	9.37	145.17	67.67
5	27.00	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.77	1.94	1.81	7.68	7.17	0.125	0.500	15.99	4.00	61.42	28.64	38.37	9.59	147.42	68.74
6	28.50	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.78	1.94	1.81	7.64	7.12	0.123	0.491	16.30	4.07	62.22	29.02	39.12	9.78	149.33	69.65
7	30.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.79	1.94	1.81	7.60	7.09	0.121	0.483	16.55	4.14	62.87	29.33	39.73	9.93	150.88	70.38

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-17	-
Chainage	2+230	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	206.39	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	14.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-17	1.00	22.00	19.50	18.00	321.84	145.07	11.18	2.79
BH-17	1.00	23.50	21.00	19.50	342.29	161.03	11.38	2.84
BH-17	1.00	25.00	22.50	21.00	362.73	176.99	11.56	2.89
BH-17	1.00	26.50	24.00	22.50	383.17	192.95	11.79	2.95
BH-17	1.00	28.00	25.50	24.00	403.62	208.91	11.97	2.99
BH-17	1.00	29.50	27.00	25.50	424.06	224.87	12.13	3.03
BH-17	1.00	30.00	27.50	26.00	430.87	230.19	12.25	3.06

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	13.31	26.63	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	39.94	53.25	4.71	7.25	34.64	41.89	16.76	8.08
3	5.50	7.00	1.50	Granular	17.75	0.03	24	-	8.00	9.78	1.00	-	6.25	7.00	66.56	79.88	4.71	13.19	67.18	87.62	35.05	13.42
4	7.00	8.50	1.50	Granular	17.75	0.03	24	-	8.00	9.78	1.00	-	7.75	8.50	93.19	106.50	4.71	18.46	87.71	126.61	50.64	20.24
5	8.50	10.00	1.50	Granular	19.10	0.00	27	-	13.80	15.50	1.00	-	9.25	10.00	120.83	135.15	4.71	26.93	175.55	241.38	96.55	29.43
6	10.00	11.50	1.50	Granular	19.10	0.00	27	-	13.80	15.50	1.00	-	10.75	11.50	149.48	163.80	4.71	33.31	210.56	309.70	123.88	40.40
7	11.50	13.00	1.50	Granular	19.10	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	178.13	192.45	4.71	41.17	282.08	422.38	168.95	53.58
8	13.00	14.50	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	199.42	206.39	4.71	46.09	295.58	481.98	192.79	68.14
9	14.50	16.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	206.39	206.39	4.71	47.70	296.14	530.24	212.10	83.14
10	16.00	17.50	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	206.39	206.39	4.71	47.70	296.14	577.94	231.18	98.15
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	206.39	206.39	4.71	49.40	334.52	665.72	266.29	113.63
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	206.39	206.39	4.71	49.40	334.52	715.13	286.05	129.11
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	206.39	206.39	4.71	51.11	372.89	804.61	321.84	145.07
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	206.39	206.39	4.71	51.11	372.89	855.72	342.29	161.03
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	206.39	206.39	4.71	51.11	372.89	906.82	362.73	176.99
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	206.39	206.39	4.71	51.11	372.89	957.93	383.17	192.95
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	206.39	206.39	4.71	51.11	372.89	1009.04	403.62	208.91
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	206.39	206.39	4.71	51.11	372.89	1060.15	424.06	224.87
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	206.39	206.39	1.57	17.04	372.89	1077.18	430.87	230.19

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.18E+03	3.40	1.18	2.00	1.83	6.79	6.22	0.179	0.716	11.18	2.79	37.95	17.38	26.83	6.71	91.07	41.71
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.84	38.40	17.59	27.31	6.83	92.16	42.21
3	24.00	24	2.96E+07	4.91E-02	3.35E+03	3.37	1.19	1.99	1.83	6.71	6.15	0.173	0.692	11.56	2.89	38.81	17.78	27.75	6.94	93.14	42.67
4	25.50	24	2.96E+07	4.91E-02	3.45E+03	3.35	1.19	1.99	1.83	6.67	6.11	0.170	0.679	11.79	2.95	39.31	18.02	28.29	7.07	94.35	43.24
5	27.00	25	2.96E+07	4.91E-02	3.54E+03	3.33	1.20	1.99	1.83	6.64	6.08	0.167	0.668	11.97	2.99	39.72	18.21	28.73	7.18	95.34	43.70
6	28.50	25	2.96E+07	4.91E-02	3.61E+03	3.32	1.21	1.99	1.83	6.61	6.06	0.165	0.660	12.13	3.03	40.07	18.37	29.11	7.28	96.17	44.09
7	30.00	26	2.96E+07	4.91E-02	3.67E+03	3.31	1.21	1.99	1.83	6.59	6.04	0.163	0.653	12.25	3.06	40.34	18.50	29.41	7.35	96.83	44.40

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-17	-
Chainage	2+230	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	236.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	14.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-17	1.20	22.00	19.50	18.00	468.12	189.73	14.55	3.64
BH-17	1.20	23.50	21.00	19.50	496.29	211.82	14.80	3.70
BH-17	1.20	25.00	22.50	21.00	524.46	233.91	15.04	3.76
BH-17	1.20	26.50	24.00	22.50	552.62	256.00	15.33	3.83
BH-17	1.20	28.00	25.50	24.00	580.79	278.10	15.57	3.89
BH-17	1.20	29.50	27.00	25.50	608.96	300.19	15.78	3.94
BH-17	1.20	30.00	27.50	26.00	618.34	307.55	15.94	3.99

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	13.31	26.63	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	39.94	53.25	5.65	8.70	50.69	59.39	23.76	11.15
3	5.50	7.00	1.50	Granular	17.75	0.03	24	-	8.00	9.78	1.00	-	6.25	7.00	66.56	79.88	5.65	15.82	98.36	122.88	49.15	17.95
4	7.00	8.50	1.50	Granular	17.75	0.03	24	-	8.00	9.78	1.00	-	7.75	8.50	93.19	106.50	5.65	22.15	127.92	174.60	69.84	26.53
5	8.50	10.00	1.50	Granular	19.10	0.00	27	-	13.80	15.50	1.00	-	9.25	10.00	120.83	135.15	5.65	32.31	255.78	334.78	133.91	37.95
6	10.00	11.50	1.50	Granular	19.10	0.00	27	-	13.80	15.50	1.00	-	10.75	11.50	149.48	163.80	5.65	39.98	306.20	425.17	170.07	51.52
7	11.50	13.00	1.50	Granular	19.10	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	178.13	192.45	5.65	49.40	409.59	577.96	231.19	67.73
8	13.00	14.50	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	199.42	206.39	5.65	55.31	427.30	650.98	260.39	85.59
9	14.50	16.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	214.04	221.68	5.65	59.36	459.18	742.22	296.89	104.58
10	16.00	17.50	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	229.33	236.97	5.65	63.60	490.10	836.74	334.70	124.77
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	236.97	236.97	5.65	68.07	553.60	968.31	387.33	146.20
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	236.97	236.97	5.65	68.07	553.60	1036.38	414.55	167.64
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	236.97	236.97	5.65	70.42	617.11	1170.31	468.12	189.73
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	236.97	236.97	5.65	70.42	617.11	1240.72	496.29	211.82
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	236.97	236.97	5.65	70.42	617.11	1311.14	524.46	233.91
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	236.97	236.97	5.65	70.42	617.11	1381.56	552.62	256.00
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	236.97	236.97	5.65	70.42	617.11	1451.97	580.79	278.10
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	236.97	236.97	5.65	70.42	617.11	1522.39	608.96	300.19
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	236.97	236.97	1.88	23.47	617.11	1545.86	618.34	307.55

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.02	2.01	1.83	7.93	7.22	0.138	0.550	14.55	3.64	57.68	26.25	34.91	8.73	138.42	63.00
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.80	3.70	58.36	26.57	35.53	8.88	140.06	63.76
3	24.00	24	2.96E+07	1.02E-01	3.35E+03	3.90	1.03	2.01	1.83	7.84	7.14	0.133	0.532	15.04	3.76	58.98	26.85	36.10	9.03	141.56	64.45
4	25.50	24	2.96E+07	1.02E-01	3.45E+03	3.87	1.03	2.01	1.83	7.79	7.10	0.130	0.522	15.33	3.83	59.75	27.21	36.80	9.20	143.39	65.30
5	27.00	25	2.96E+07	1.02E-01	3.54E+03	3.85	1.04	2.01	1.83	7.75	7.06	0.128	0.514	15.57	3.89	60.37	27.50	37.38	9.34	144.88	65.99
6	28.50	25	2.96E+07	1.02E-01	3.61E+03	3.84	1.04	2.01	1.83	7.72	7.03	0.127	0.507	15.78	3.94	60.89	27.74	37.87	9.47	146.14	66.58
7	30.00	26	2.96E+07	1.02E-01	3.67E+03	3.83	1.05	2.01	1.83	7.69	7.01	0.125	0.502	15.94	3.99	61.31	27.93	38.26	9.56	147.14	67.04

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-18	-
Chainage	2+567	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	213.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	16.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-18	1.00	22.00	19.50	18.00	253.55	138.21	9.06	2.26
BH-18	1.00	23.50	21.00	19.50	271.89	152.70	9.14	2.29
BH-18	1.00	25.00	22.50	21.00	306.79	167.68	9.23	2.31
BH-18	1.00	26.50	24.00	22.50	325.83	182.65	9.33	2.33
BH-18	1.00	28.00	25.50	24.00	378.00	198.62	9.42	2.36
BH-18	1.00	29.50	27.00	25.50	398.46	214.59	9.56	2.39
BH-18	1.00	30.00	27.50	26.00	421.37	220.07	9.70	2.43

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.50	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	37.13	49.50	4.71	7.05	37.78	44.83	17.93	8.02
3	5.50	7.00	1.50	Granular	17.85	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	62.89	76.28	4.71	13.50	87.68	108.23	43.29	13.45
4	7.00	8.50	1.50	Granular	17.85	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.66	103.05	4.71	19.24	115.53	155.31	62.13	20.49
5	8.50	10.00	1.50	Granular	17.85	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	116.44	129.83	4.71	24.99	143.37	208.14	83.26	29.13
6	10.00	11.50	1.50	Granular	17.85	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	143.21	156.60	4.71	30.74	171.21	266.72	106.69	39.39
7	11.50	13.00	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	170.85	185.10	4.71	38.08	236.54	370.13	148.05	51.70
8	13.00	14.50	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	199.35	213.60	4.71	44.43	271.37	449.38	179.75	65.79
9	14.50	16.00	1.50	Granular	19.50	0.05	27	-	13.80	15.50	1.00	-	15.25	16.00	213.60	213.60	4.71	47.60	271.64	497.26	198.90	80.77
10	16.00	17.50	1.50	Granular	9.69	0.05	27	-	13.80	15.50	1.00	-	16.75	17.50	213.60	213.60	4.71	47.60	266.31	539.53	215.81	95.74
11	17.50	19.00	1.50	Granular	9.69	0.08	25	-	10.00	10.88	1.00	-	18.25	19.00	213.60	213.60	4.71	44.08	187.00	504.30	201.72	109.74
12	19.00	20.50	1.50	Granular	9.69	0.08	25	-	10.00	10.88	1.00	-	19.75	20.50	213.60	213.60	4.71	44.08	187.00	548.38	219.35	123.73
13	20.50	22.00	1.50	Granular	9.69	0.07	26	-	11.90	13.19	1.00	-	21.25	22.00	213.60	213.60	4.71	45.84	226.65	633.87	253.55	138.21
14	22.00	23.50	1.50	Granular	9.69	0.07	26	-	11.90	13.19	1.00	-	22.75	23.50	213.60	213.60	4.71	45.84	226.65	679.71	271.89	152.70
15	23.50	25.00	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	24.25	25.00	213.60	213.60	4.71	47.60	266.31	766.97	306.79	167.68
16	25.00	26.50	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	25.75	26.50	213.60	213.60	4.71	47.60	266.31	814.57	325.83	182.65
17	26.50	28.00	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	27.25	28.00	213.60	213.60	4.71	51.13	345.61	945.01	378.00	198.62
18	28.00	29.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	28.75	29.50	213.60	213.60	4.71	51.13	345.61	996.14	398.46	214.59
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	213.60	213.60	1.57	17.63	385.26	1053.42	421.37	220.07

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.29E+03	3.63	1.10	2.00	1.83	7.28	6.65	0.221	0.883	9.06	2.26	32.98	15.06	21.73	5.43	79.15	36.14
2	22.50	16	2.96E+07	4.91E-02	2.32E+03	3.62	1.10	2.00	1.83	7.26	6.63	0.219	0.875	9.14	2.29	33.18	15.15	21.94	5.48	79.64	36.37
3	24.00	17	2.96E+07	4.91E-02	2.36E+03	3.61	1.11	2.00	1.83	7.24	6.61	0.217	0.867	9.23	2.31	33.40	15.26	22.16	5.54	80.17	36.62
4	25.50	17	2.96E+07	4.91E-02	2.40E+03	3.60	1.11	2.00	1.83	7.21	6.59	0.214	0.857	9.33	2.33	33.65	15.37	22.40	5.60	80.75	36.89
5	27.00	17	2.96E+07	4.91E-02	2.43E+03	3.59	1.11	2.00	1.83	7.19	6.57	0.212	0.849	9.42	2.36	33.86	15.47	22.61	5.65	81.27	37.13
6	28.50	18	2.96E+07	4.91E-02	2.49E+03	3.57	1.12	2.00	1.83	7.15	6.54	0.209	0.837	9.56	2.39	34.19	15.62	22.94	5.73	82.05	37.49
7	30.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.51	0.206	0.824	9.70	2.43	34.53	15.78	23.29	5.82	82.88	37.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-18	-
Chainage	2+567	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	257.39	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	16.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-18	1.20	22.00	19.50	18.00	371.43	184.72	11.79	2.95
BH-18	1.20	23.50	21.00	19.50	397.94	205.66	11.90	2.98
BH-18	1.20	25.00	22.50	21.00	453.00	227.30	12.02	3.01
BH-18	1.20	26.50	24.00	22.50	480.53	248.95	12.15	3.04
BH-18	1.20	28.00	25.50	24.00	565.14	272.03	12.27	3.07
BH-18	1.20	29.50	27.00	25.50	594.72	295.11	12.44	3.11
BH-18	1.20	30.00	27.50	26.00	632.43	303.04	12.63	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.50	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	37.13	49.50	5.65	8.46	55.53	63.99	25.60	11.08
3	5.50	7.00	1.50	Granular	17.85	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	62.89	76.28	5.65	16.20	128.68	153.33	61.33	17.99
4	7.00	8.50	1.50	Granular	17.85	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.66	103.05	5.65	23.09	168.77	216.51	86.61	26.83
5	8.50	10.00	1.50	Granular	17.85	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	116.44	129.83	5.65	29.99	208.86	286.59	114.64	37.60
6	10.00	11.50	1.50	Granular	17.85	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	143.21	156.60	5.65	36.88	248.95	363.56	145.43	50.30
7	11.50	13.00	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	170.85	185.10	5.65	45.69	343.59	503.90	201.56	65.47
8	13.00	14.50	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	199.35	213.60	5.65	53.31	393.74	607.36	242.95	82.77
9	14.50	16.00	1.50	Granular	19.50	0.05	27	-	13.80	15.50	1.00	-	15.25	16.00	228.23	242.85	5.65	61.04	445.69	720.34	288.14	102.24
10	16.00	17.50	1.50	Granular	9.69	0.05	27	-	13.80	15.50	1.00	-	16.75	17.50	250.12	257.39	5.65	66.89	462.06	803.60	321.44	123.34
11	17.50	19.00	1.50	Granular	9.69	0.08	25	-	10.00	10.88	1.00	-	18.25	19.00	257.39	257.39	5.65	63.74	324.46	729.74	291.90	143.56
12	19.00	20.50	1.50	Granular	9.69	0.08	25	-	10.00	10.88	1.00	-	19.75	20.50	257.39	257.39	5.65	63.74	324.46	793.48	317.39	163.78
13	20.50	22.00	1.50	Granular	9.69	0.07	26	-	11.90	13.19	1.00	-	21.25	22.00	257.39	257.39	5.65	66.29	393.26	928.57	371.43	184.72
14	22.00	23.50	1.50	Granular	9.69	0.07	26	-	11.90	13.19	1.00	-	22.75	23.50	257.39	257.39	5.65	66.29	393.26	994.85	397.94	205.66
15	23.50	25.00	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	24.25	25.00	257.39	257.39	5.65	68.84	462.06	1132.49	453.00	227.30
16	25.00	26.50	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	25.75	26.50	257.39	257.39	5.65	68.84	462.06	1201.32	480.53	248.95
17	26.50	28.00	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	27.25	28.00	257.39	257.39	5.65	73.94	599.66	1412.86	565.14	272.03
18	28.00	29.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	28.75	29.50	257.39	257.39	5.65	73.94	599.66	1486.79	594.72	295.11
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	257.39	257.39	1.88	25.49	668.46	1581.09	632.43	303.04

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.29E+03	4.21	0.95	2.02	1.84	8.51	7.72	0.170	0.678	11.79	2.95	50.15	22.76	28.30	7.08	120.35	54.62
2	22.50	16	2.96E+07	1.02E-01	2.32E+03	4.19	0.95	2.02	1.84	8.48	7.70	0.168	0.672	11.90	2.98	50.46	22.90	28.56	7.14	121.10	54.97
3	24.00	17	2.96E+07	1.02E-01	2.36E+03	4.18	0.96	2.02	1.84	8.45	7.67	0.166	0.666	12.02	3.01	50.79	23.06	28.85	7.21	121.90	55.34
4	25.50	17	2.96E+07	1.02E-01	2.40E+03	4.17	0.96	2.02	1.84	8.42	7.65	0.165	0.658	12.15	3.04	51.16	23.23	29.16	7.29	122.78	55.75
5	27.00	17	2.96E+07	1.02E-01	2.43E+03	4.15	0.96	2.02	1.84	8.39	7.62	0.163	0.652	12.27	3.07	51.49	23.38	29.44	7.36	123.57	56.11
6	28.50	18	2.96E+07	1.02E-01	2.49E+03	4.14	0.97	2.02	1.84	8.35	7.59	0.161	0.643	12.44	3.11	51.98	23.61	29.87	7.47	124.75	56.66
7	30.00	18	2.96E+07	1.02E-01	2.55E+03	4.12	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.63	3.16	52.50	23.85	30.32	7.58	126.00	57.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-18A	-
Chainage	2+279	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	208.79	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-18A	1.00	22.00	19.50	16.50	321.00	143.29	11.27	2.82
BH-18A	1.00	23.50	21.00	18.00	341.68	159.42	11.53	2.88
BH-18A	1.00	25.00	22.50	19.50	362.36	175.54	11.85	2.96
BH-18A	1.00	26.50	24.00	21.00	383.04	191.67	12.12	3.03
BH-18A	1.00	28.00	25.50	22.50	403.72	207.80	12.35	3.09
BH-18A	1.00	29.50	27.00	24.00	424.41	223.92	12.54	3.13
BH-18A	1.00	30.00	27.50	24.50	431.30	229.30	12.69	3.17

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	13.31	26.63	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	39.94	53.25	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.56	79.88	4.71	14.29	91.38	105.67	42.27	11.70
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	93.19	106.50	4.71	20.00	119.07	153.35	61.34	18.95
5	8.50	10.00	1.50	Granular	19.50	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	121.13	135.75	4.71	25.99	150.30	210.58	84.23	27.87
6	10.00	11.50	1.50	Granular	19.50	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	150.38	165.00	4.71	32.27	180.72	273.27	109.31	38.56
7	11.50	13.00	1.50	Granular	19.50	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	179.63	194.25	4.71	41.51	284.85	418.92	167.57	51.83
8	13.00	14.50	1.50	Granular	9.69	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	201.52	208.79	4.71	46.58	299.20	479.84	191.94	66.52
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	208.79	208.79	4.71	49.98	337.98	568.60	227.44	82.17
10	16.00	17.50	1.50	Granular	9.09	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	208.79	208.79	4.71	49.98	337.56	618.16	247.26	97.81
11	17.50	19.00	1.50	Granular	9.09	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	208.79	208.79	4.71	46.53	260.10	587.23	234.89	112.49
12	19.00	20.50	1.50	Granular	10.19	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	208.79	208.79	4.71	46.53	260.70	634.36	253.74	127.17
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	208.79	208.79	4.71	51.70	377.14	802.50	321.00	143.29
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	208.79	208.79	4.71	51.70	377.14	854.21	341.68	159.42
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	208.79	208.79	4.71	51.70	377.14	905.91	362.36	175.54
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	208.79	208.79	4.71	51.70	377.14	957.61	383.04	191.67
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	208.79	208.79	4.71	51.70	377.14	1009.31	403.72	207.80
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	208.79	208.79	4.71	51.70	377.14	1061.01	424.41	223.92
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	208.79	208.79	1.57	17.23	377.14	1078.25	431.30	229.30

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.91E+03	3.46	1.59	1.95	1.81	6.77	6.29	0.178	0.710	11.27	2.82	38.15	17.70	27.04	6.76	91.55	42.49
2	22.50	21	2.96E+07	4.91E-02	3.01E+03	3.44	1.60	1.95	1.81	6.72	6.24	0.174	0.694	11.53	2.88	38.73	17.98	27.66	6.92	92.96	43.16
3	24.00	22	2.96E+07	4.91E-02	3.15E+03	3.41	1.61	1.95	1.81	6.66	6.19	0.169	0.675	11.85	2.96	39.45	18.32	28.43	7.11	94.68	43.97
4	25.50	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.660	12.12	3.03	40.05	18.61	29.09	7.27	96.13	44.66
5	27.00	24	2.96E+07	4.91E-02	3.35E+03	3.37	1.63	1.95	1.81	6.57	6.10	0.162	0.648	12.35	3.09	40.55	18.84	29.63	7.41	97.31	45.22
6	28.50	24	2.96E+07	4.91E-02	3.44E+03	3.35	1.64	1.95	1.81	6.53	6.07	0.160	0.638	12.54	3.13	40.96	19.04	30.09	7.52	98.32	45.69
7	30.00	25	2.96E+07	4.91E-02	3.50E+03	3.34	1.65	1.95	1.81	6.51	6.05	0.158	0.630	12.69	3.17	41.30	19.20	30.46	7.61	99.12	46.08

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-18A	-
Chainage	2+279	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	163.42	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Grip Length	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-18A	1.20	22.00	19.50	16.50	303.65	127.05	14.63	3.66
BH-18A	1.20	23.50	21.00	18.00	323.07	143.02	14.97	3.74
BH-18A	1.20	25.00	22.50	19.50	342.50	158.99	15.39	3.85
BH-18A	1.20	26.50	24.00	21.00	361.92	174.97	15.75	3.94
BH-18A	1.20	28.00	25.50	22.50	381.34	190.94	16.04	4.01
BH-18A	1.20	29.50	27.00	24.00	400.77	206.91	16.29	4.07
BH-18A	1.20	30.00	27.50	24.50	407.24	212.23	16.49	4.12

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	0.60	-	3.25	4.00	13.31	26.63	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	0.60	-	4.75	5.50	39.94	53.25	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	0.80	-	6.25	7.00	59.21	65.17	5.65	12.20	104.01	116.21	46.48	14.50
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	0.80	-	7.75	8.50	71.12	77.08	5.65	14.65	121.85	148.70	59.48	20.98
5	8.50	10.00	1.50	Granular	9.69	0.03	26	-	11.90	13.19	0.80	-	9.25	10.00	84.35	91.62	5.65	17.38	145.04	189.27	75.71	28.22
6	10.00	11.50	1.50	Granular	9.69	0.03	26	-	11.90	13.19	0.80	-	10.75	11.50	98.89	106.16	5.65	20.37	166.81	231.42	92.57	36.30
7	11.50	13.00	1.50	Granular	9.69	0.00	28	-	15.70	17.82	0.90	-	12.25	13.00	113.43	120.70	5.65	28.31	254.44	347.36	138.94	46.60
8	13.00	14.50	1.50	Granular	9.69	0.00	28	-	15.70	17.82	0.90	-	13.75	14.50	127.97	135.24	5.65	31.94	283.85	408.71	163.48	57.92
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	0.95	-	15.25	16.00	142.51	149.78	5.65	38.89	353.81	517.56	207.02	71.18
10	16.00	17.50	1.50	Granular	9.09	0.02	29	-	17.60	20.13	0.95	-	16.75	17.50	156.60	163.42	5.65	42.73	384.25	590.73	236.29	85.52
11	17.50	19.00	1.50	Granular	9.09	0.10	27	-	13.80	15.50	0.85	-	18.25	19.00	163.42	163.42	5.65	37.15	296.13	539.76	215.90	98.30
12	19.00	20.50	1.50	Granular	10.19	0.10	27	-	13.80	15.50	0.85	-	19.75	20.50	163.42	163.42	5.65	37.15	297.16	577.94	231.18	111.08
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	163.42	163.42	5.65	48.56	429.77	759.12	303.65	127.05
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	163.42	163.42	5.65	48.56	429.77	807.68	323.07	143.02
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	163.42	163.42	5.65	48.56	429.77	856.24	342.50	158.99
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	163.42	163.42	5.65	48.56	429.77	904.80	361.92	174.97
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	163.42	163.42	5.65	48.56	429.77	953.36	381.34	190.94
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	163.42	163.42	5.65	48.56	429.77	1001.92	400.77	206.91
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	163.42	163.42	1.88	16.19	429.77	1018.11	407.24	212.23

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.91E+03	4.01	1.37	1.97	1.82	7.91	7.30	0.137	0.547	14.63	3.66	57.91	26.70	35.12	8.78	138.99	64.09
2	22.50	21	2.96E+07	1.02E-01	3.01E+03	3.98	1.38	1.97	1.82	7.85	7.25	0.134	0.534	14.97	3.74	58.80	27.12	35.94	8.98	141.13	65.09
3	24.00	22	2.96E+07	1.02E-01	3.15E+03	3.95	1.39	1.97	1.82	7.78	7.18	0.130	0.520	15.39	3.85	59.89	27.63	36.94	9.23	143.74	66.32
4	25.50	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.508	15.75	3.94	60.81	28.07	37.79	9.45	145.94	67.36
5	27.00	24	2.96E+07	1.02E-01	3.35E+03	3.90	1.41	1.97	1.82	7.68	7.09	0.125	0.499	16.04	4.01	61.56	28.42	38.49	9.62	147.74	68.21
6	28.50	24	2.96E+07	1.02E-01	3.44E+03	3.88	1.42	1.97	1.82	7.64	7.05	0.123	0.491	16.29	4.07	62.19	28.72	39.09	9.77	149.27	68.93
7	30.00	25	2.96E+07	1.02E-01	3.50E+03	3.86	1.42	1.97	1.82	7.61	7.03	0.121	0.485	16.49	4.12	62.70	28.96	39.57	9.89	150.48	69.50

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-19	-
Chainage	2+591	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	210.38	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	15.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-19	1.00	22.00	19.50	16.50	280.47	136.03	8.96	2.24
BH-19	1.00	23.50	21.00	18.00	299.91	151.29	9.12	2.28
BH-19	1.00	25.00	22.50	19.50	352.03	167.53	9.28	2.32
BH-19	1.00	26.50	24.00	21.00	372.87	183.76	9.45	2.36
BH-19	1.00	28.00	25.50	22.50	393.71	200.00	9.62	2.41
BH-19	1.00	29.50	27.00	24.00	414.55	216.24	9.78	2.45
BH-19	1.00	30.00	27.50	24.50	421.49	221.65	9.93	2.48

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.50	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	6.25	7.00	62.81	76.13	4.71	11.41	48.32	59.72	23.89	10.89
4	7.00	8.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	7.75	8.50	89.44	102.75	4.71	16.24	64.24	91.89	36.75	17.09
5	8.50	10.00	1.50	Granular	17.75	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	116.06	129.38	4.71	23.95	117.95	169.54	67.82	25.44
6	10.00	11.50	1.50	Granular	18.00	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	142.88	156.38	4.71	29.48	141.20	222.28	88.91	35.35
7	11.50	13.00	1.50	Granular	18.00	0.02	26	-	11.90	13.19	1.00	-	12.25	13.00	169.88	183.38	4.71	36.46	199.12	316.66	126.66	47.20
8	13.00	14.50	1.50	Granular	18.00	0.02	26	-	11.90	13.19	1.00	-	13.75	14.50	196.88	210.38	4.71	42.25	227.20	386.99	154.79	60.68
9	14.50	16.00	1.50	Granular	8.19	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	210.38	210.38	4.71	48.62	300.50	508.91	203.56	75.95
10	16.00	17.50	1.50	Granular	9.09	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	210.38	210.38	4.71	48.62	301.06	558.09	223.24	91.21
11	17.50	19.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	210.38	210.38	4.71	46.89	262.04	565.96	226.38	105.99
12	19.00	20.50	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	210.38	210.38	4.71	46.89	262.04	612.84	245.14	120.77
13	20.50	22.00	1.50	Granular	10.19	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	210.38	210.38	4.71	48.62	301.74	701.16	280.47	136.03
14	22.00	23.50	1.50	Granular	10.19	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	210.38	210.38	4.71	48.62	301.74	749.79	299.91	151.29
15	23.50	25.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	210.38	210.38	4.71	52.09	379.94	880.08	352.03	167.53
16	25.00	26.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	210.38	210.38	4.71	52.09	379.94	932.18	372.87	183.76
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	210.38	210.38	4.71	52.09	379.94	984.27	393.71	200.00
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	210.38	210.38	4.71	52.09	379.94	1036.37	414.55	216.24
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	210.38	210.38	1.57	17.36	379.94	1053.73	421.49	221.65

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	14	2.96E+07	4.91E-02	2.03E+03	3.72	1.48	1.96	1.82	7.31	6.76	0.223	0.893	8.96	2.24	32.74	15.15	21.50	5.37	78.57	36.35
2	22.50	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.49	1.96	1.82	7.27	6.72	0.219	0.877	9.12	2.28	33.14	15.34	21.89	5.47	79.54	36.80
3	24.00	15	2.96E+07	4.91E-02	2.15E+03	3.68	1.49	1.96	1.82	7.22	6.69	0.216	0.862	9.28	2.32	33.52	15.51	22.27	5.57	80.44	37.23
4	25.50	16	2.96E+07	4.91E-02	2.21E+03	3.66	1.50	1.96	1.82	7.18	6.65	0.212	0.846	9.45	2.36	33.94	15.71	22.69	5.67	81.45	37.71
5	27.00	16	2.96E+07	4.91E-02	2.27E+03	3.64	1.51	1.96	1.82	7.14	6.61	0.208	0.831	9.62	2.41	34.34	15.90	23.09	5.77	82.42	38.16
6	28.50	16	2.96E+07	4.91E-02	2.33E+03	3.62	1.52	1.96	1.82	7.10	6.58	0.204	0.818	9.78	2.45	34.72	16.08	23.48	5.87	83.32	38.59
7	30.00	17	2.96E+07	4.91E-02	2.39E+03	3.60	1.53	1.96	1.82	7.06	6.54	0.201	0.806	9.93	2.48	35.07	16.25	23.83	5.96	84.16	38.99

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-19	-
Chainage	2+591	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	236.31	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	15.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-19	1.20	22.00	19.50	16.50	398.45	176.90	11.64	2.91
BH-19	1.20	23.50	21.00	18.00	424.67	197.63	11.85	2.96
BH-19	1.20	25.00	22.50	19.50	503.42	219.66	12.05	3.01
BH-19	1.20	26.50	24.00	21.00	531.51	241.70	12.28	3.07
BH-19	1.20	28.00	25.50	22.50	559.59	263.73	12.50	3.13
BH-19	1.20	29.50	27.00	24.00	587.68	285.77	12.71	3.18
BH-19	1.20	30.00	27.50	24.50	597.04	293.12	12.90	3.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.50	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	6.25	7.00	62.81	76.13	5.65	13.69	70.38	84.07	33.63	14.92
4	7.00	8.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	7.75	8.50	89.44	102.75	5.65	19.49	93.31	126.48	50.59	22.75
5	8.50	10.00	1.50	Granular	17.75	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	116.06	129.38	5.65	28.74	171.86	233.77	93.51	33.17
6	10.00	11.50	1.50	Granular	18.00	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	142.88	156.38	5.65	35.38	205.37	302.67	121.07	45.45
7	11.50	13.00	1.50	Granular	18.00	0.02	26	-	11.90	13.19	1.00	-	12.25	13.00	169.88	183.38	5.65	43.75	289.16	430.21	172.08	60.08
8	13.00	14.50	1.50	Granular	18.00	0.02	26	-	11.90	13.19	1.00	-	13.75	14.50	196.88	210.38	5.65	50.70	329.59	521.34	208.54	76.65
9	14.50	16.00	1.50	Granular	8.19	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	216.52	222.67	5.65	60.05	459.03	710.83	284.33	95.84
10	16.00	17.50	1.50	Granular	9.09	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	229.49	236.31	5.65	63.65	487.58	803.02	321.21	116.03
11	17.50	19.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	236.31	236.31	5.65	63.20	424.39	803.03	321.21	136.10
12	19.00	20.50	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	236.31	236.31	5.65	63.20	424.39	866.23	346.49	156.17
13	20.50	22.00	1.50	Granular	10.19	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	236.31	236.31	5.65	65.54	488.75	996.13	398.45	176.90
14	22.00	23.50	1.50	Granular	10.19	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	236.31	236.31	5.65	65.54	488.75	1061.67	424.67	197.63
15	23.50	25.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	236.31	236.31	5.65	70.22	615.42	1258.55	503.42	219.66
16	25.00	26.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	236.31	236.31	5.65	70.22	615.42	1328.77	531.51	241.70
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	236.31	236.31	5.65	70.22	615.42	1398.99	559.59	263.73
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	236.31	236.31	5.65	70.22	615.42	1469.21	587.68	285.77
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	236.31	236.31	1.88	23.41	615.42	1492.61	597.04	293.12

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	14	2.96E+07	1.02E-01	2.03E+03	4.31	1.28	1.98	1.82	8.54	7.85	0.172	0.687	11.64	2.91	49.71	22.85	27.93	6.98	119.30	54.83
2	22.50	15	2.96E+07	1.02E-01	2.09E+03	4.28	1.28	1.98	1.82	8.49	7.81	0.169	0.675	11.85	2.96	50.32	23.13	28.44	7.11	120.76	55.52
3	24.00	15	2.96E+07	1.02E-01	2.15E+03	4.26	1.29	1.98	1.82	8.44	7.77	0.166	0.664	12.05	3.01	50.89	23.40	28.93	7.23	122.13	56.16
4	25.50	16	2.96E+07	1.02E-01	2.21E+03	4.23	1.30	1.98	1.82	8.39	7.72	0.163	0.651	12.28	3.07	51.53	23.70	29.48	7.37	123.67	56.88
5	27.00	16	2.96E+07	1.02E-01	2.27E+03	4.21	1.31	1.98	1.82	8.34	7.68	0.160	0.640	12.50	3.13	52.14	23.99	30.00	7.50	125.13	57.57
6	28.50	16	2.96E+07	1.02E-01	2.33E+03	4.19	1.31	1.98	1.82	8.30	7.64	0.157	0.630	12.71	3.18	52.71	24.26	30.50	7.62	126.51	58.21
7	30.00	17	2.96E+07	1.02E-01	2.39E+03	4.17	1.32	1.98	1.82	8.25	7.60	0.155	0.620	12.90	3.22	53.24	24.51	30.96	7.74	127.78	58.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-19A	-
Chainage	2+420	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	208.19	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-19A	1.00	22.00	19.50	19.50	296.57	148.35	10.47	2.62
BH-19A	1.00	23.50	21.00	21.00	315.81	163.47	10.62	2.65
BH-19A	1.00	25.00	22.50	22.50	367.33	179.56	10.77	2.69
BH-19A	1.00	26.50	24.00	24.00	388.29	195.64	10.92	2.73
BH-19A	1.00	28.00	25.50	25.50	408.91	211.72	11.09	2.77
BH-19A	1.00	29.50	27.00	27.00	429.53	227.81	11.24	2.81
BH-19A	1.00	30.00	27.50	27.50	436.41	233.17	11.36	2.84

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	4.71	2.63	28.57	31.20	12.48	5.13
2	4.00	5.50	1.50	Granular	17.00	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	38.25	51.00	4.71	7.89	50.44	60.96	24.38	8.99
3	5.50	7.00	1.50	Granular	19.10	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	65.33	79.65	4.71	13.48	75.83	99.84	39.94	14.42
4	7.00	8.50	1.50	Granular	19.10	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	93.98	108.30	4.71	19.39	100.40	143.80	57.52	21.50
5	8.50	10.00	1.50	Granular	19.10	0.05	27	-	13.80	15.50	1.00	-	9.25	10.00	122.63	136.95	4.71	27.33	177.75	248.48	99.39	30.80
6	10.00	11.50	1.50	Granular	19.10	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	151.28	165.60	4.71	33.71	212.76	317.20	126.88	41.89
7	11.50	13.00	1.50	Granular	19.10	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	179.93	194.25	4.71	41.58	284.60	430.63	172.25	55.18
8	13.00	14.50	1.50	Granular	9.29	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	201.22	208.19	4.71	46.51	298.11	490.64	196.26	69.85
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	208.19	208.19	4.71	49.84	337.37	579.74	231.90	85.46
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	208.19	208.19	4.71	49.84	337.37	629.57	251.83	101.06
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	208.19	208.19	4.71	51.55	376.08	719.83	287.93	117.14
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	208.19	208.19	4.71	51.55	376.08	771.38	308.55	133.23
13	20.50	22.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	208.19	208.19	4.71	48.12	297.99	741.41	296.57	148.35
14	22.00	23.50	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	208.19	208.19	4.71	48.12	297.99	789.53	315.81	163.47
15	23.50	25.00	1.50	Granular	9.09	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	208.19	208.19	4.71	51.55	375.23	918.33	367.33	179.56
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	208.19	208.19	4.71	51.55	376.08	970.72	388.29	195.64
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	208.19	208.19	4.71	51.55	376.08	1022.28	408.91	211.72
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	208.19	208.19	4.71	51.55	376.08	1073.83	429.53	227.81
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	208.19	208.19	1.57	17.18	376.08	1091.02	436.41	233.17

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.28E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.764	10.47	2.62	36.32	16.33	25.12	6.28	87.18	39.19
2	22.50	24	2.96E+07	4.91E-02	3.35E+03	3.37	0.74	2.05	1.84	6.91	6.21	0.188	0.754	10.62	2.65	36.66	16.48	25.48	6.37	87.99	39.56
3	24.00	24	2.96E+07	4.91E-02	3.43E+03	3.35	0.75	2.05	1.84	6.87	6.18	0.186	0.743	10.77	2.69	37.01	16.64	25.84	6.46	88.83	39.95
4	25.50	25	2.96E+07	4.91E-02	3.51E+03	3.34	0.75	2.05	1.84	6.84	6.15	0.183	0.732	10.92	2.73	37.37	16.81	26.22	6.55	89.69	40.34
5	27.00	25	2.96E+07	4.91E-02	3.60E+03	3.32	0.75	2.05	1.84	6.81	6.12	0.180	0.721	11.09	2.77	37.76	16.98	26.63	6.66	90.62	40.76
6	28.50	26	2.96E+07	4.91E-02	3.67E+03	3.31	0.76	2.05	1.84	6.78	6.10	0.178	0.712	11.24	2.81	38.09	17.13	26.97	6.74	91.40	41.12
7	30.00	26	2.96E+07	4.91E-02	3.73E+03	3.30	0.76	2.05	1.84	6.75	6.08	0.176	0.705	11.36	2.84	38.35	17.26	27.25	6.81	92.04	41.41

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-19A	-
Chainage	2+420	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	238.77	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-19A	1.20	22.00	19.50	19.50	424.04	193.75	13.70	3.43
BH-19A	1.20	23.50	21.00	21.00	450.53	214.66	13.90	3.47
BH-19A	1.20	25.00	22.50	22.50	529.98	236.91	14.09	3.52
BH-19A	1.20	26.50	24.00	24.00	558.95	259.15	14.30	3.57
BH-19A	1.20	28.00	25.50	25.50	587.33	281.39	14.52	3.63
BH-19A	1.20	29.50	27.00	27.00	615.71	303.63	14.71	3.68
BH-19A	1.20	30.00	27.50	27.50	625.17	311.04	14.86	3.71

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	5.65	3.16	43.07	46.23	18.49	7.22
2	4.00	5.50	1.50	Granular	17.00	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	38.25	51.00	5.65	9.47	74.56	87.19	34.88	12.24
3	5.50	7.00	1.50	Granular	19.10	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	65.33	79.65	5.65	16.18	111.37	140.18	56.07	19.15
4	7.00	8.50	1.50	Granular	19.10	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	93.98	108.30	5.65	23.27	146.75	198.83	79.53	28.04
5	8.50	10.00	1.50	Granular	19.10	0.05	27	-	13.80	15.50	1.00	-	9.25	10.00	122.63	136.95	5.65	32.79	258.95	343.82	137.53	39.60
6	10.00	11.50	1.50	Granular	19.10	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	151.28	165.60	5.65	40.46	309.37	434.70	173.88	53.30
7	11.50	13.00	1.50	Granular	19.10	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	179.93	194.25	5.65	49.90	413.23	588.46	235.38	69.65
8	13.00	14.50	1.50	Granular	9.29	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	201.22	208.19	5.65	55.81	430.94	661.97	264.79	87.65
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	215.84	223.48	5.65	62.00	522.78	815.82	326.33	107.38
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	231.13	238.77	5.65	66.39	557.72	917.14	366.86	128.35
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	238.77	238.77	5.65	70.95	621.69	1052.07	420.83	150.59
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	238.77	238.77	5.65	70.95	621.69	1123.02	449.21	172.83
13	20.50	22.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	238.77	238.77	5.65	66.22	492.56	1060.11	424.04	193.75
14	22.00	23.50	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	238.77	238.77	5.65	66.22	492.56	1126.33	450.53	214.66
15	23.50	25.00	1.50	Granular	9.09	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	238.77	238.77	5.65	70.95	620.23	1324.96	529.98	236.91
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	238.77	238.77	5.65	70.95	621.69	1397.37	558.95	259.15
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	238.77	238.77	5.65	70.95	621.69	1468.32	587.33	281.39
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	238.77	238.77	5.65	70.95	621.69	1539.27	615.71	303.63
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	238.77	238.77	1.88	23.65	621.69	1562.92	625.17	311.04

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.28E+03	3.91	0.64	2.07	1.85	8.09	7.24	0.146	0.584	13.70	3.43	55.43	24.80	32.89	8.22	133.03	59.51
2	22.50	24	2.96E+07	1.02E-01	3.35E+03	3.90	0.64	2.07	1.85	8.05	7.21	0.144	0.576	13.90	3.47	55.95	25.03	33.35	8.34	134.27	60.07
3	24.00	24	2.96E+07	1.02E-01	3.43E+03	3.88	0.64	2.07	1.85	8.01	7.17	0.142	0.568	14.09	3.52	56.48	25.27	33.83	8.46	135.55	60.65
4	25.50	25	2.96E+07	1.02E-01	3.51E+03	3.86	0.65	2.07	1.85	7.98	7.14	0.140	0.560	14.30	3.57	57.02	25.52	34.32	8.58	136.85	61.25
5	27.00	25	2.96E+07	1.02E-01	3.60E+03	3.84	0.65	2.07	1.85	7.94	7.10	0.138	0.551	14.52	3.63	57.61	25.79	34.85	8.71	138.26	61.88
6	28.50	26	2.96E+07	1.02E-01	3.67E+03	3.83	0.65	2.06	1.85	7.90	7.07	0.136	0.544	14.71	3.68	58.11	26.01	35.30	8.82	139.45	62.43
7	30.00	26	2.96E+07	1.02E-01	3.73E+03	3.81	0.66	2.06	1.85	7.87	7.05	0.135	0.538	14.86	3.71	58.50	26.19	35.66	8.92	140.41	62.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-20	-
Chainage	2+541	km
Bottom Depth of pile	27.50	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	213.75	kN/m^2
Pile shaft Length Below cut-off	25.00	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	15.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-20	1.00	22.00	19.50	18.00	269.28	138.16	8.54	2.13
BH-20	1.00	23.50	21.00	19.50	288.57	153.15	8.54	2.13
BH-20	1.00	25.00	22.50	21.00	340.81	169.12	8.54	2.13
BH-20	1.00	26.50	24.00	22.50	361.28	185.10	8.54	2.13
BH-20	1.00	27.50	25.00	23.50	391.28	196.08	8.54	2.13
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	13.31	26.63	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	39.94	53.25	4.71	7.25	34.64	41.89	16.76	8.08
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.56	79.88	4.71	14.29	91.38	112.92	45.17	13.73
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	93.19	106.50	4.71	20.00	119.07	160.60	64.24	20.98
5	8.50	10.00	1.50	Granular	17.75	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	119.81	133.13	4.71	25.71	146.75	214.00	85.60	29.83
6	10.00	11.50	1.50	Granular	18.00	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	146.63	160.13	4.71	31.47	174.94	273.66	109.46	40.29
7	11.50	13.00	1.50	Granular	18.00	0.08	25	-	10.00	10.88	1.00	-	12.25	13.00	173.63	187.13	4.71	35.83	167.57	302.12	120.85	51.97
8	13.00	14.50	1.50	Granular	17.75	0.08	25	-	10.00	10.88	1.00	-	13.75	14.50	200.44	213.75	4.71	41.36	190.31	366.21	146.49	65.20
9	14.50	16.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	15.25	16.00	213.75	213.75	4.71	45.87	225.99	447.77	179.11	79.69
10	16.00	17.50	1.50	Granular	9.09	0.03	26	-	11.90	13.19	1.00	-	16.75	17.50	213.75	213.75	4.71	45.87	226.53	494.18	197.67	94.19
11	17.50	19.00	1.50	Granular	9.09	0.08	26	-	11.90	13.19	1.00	-	18.25	19.00	213.75	213.75	4.71	45.87	226.53	540.05	216.02	108.68
12	19.00	20.50	1.50	Granular	9.09	0.08	26	-	11.90	13.19	1.00	-	19.75	20.50	213.75	213.75	4.71	45.87	226.53	585.93	234.37	123.17
13	20.50	22.00	1.50	Granular	9.09	0.07	27	-	13.80	15.50	1.00	-	21.25	22.00	213.75	213.75	4.71	47.64	266.16	673.20	269.28	138.16
14	22.00	23.50	1.50	Granular	10.19	0.07	27	-	13.80	15.50	1.00	-	22.75	23.50	213.75	213.75	4.71	47.64	266.76	721.44	288.57	153.15
15	23.50	25.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	24.25	25.00	213.75	213.75	4.71	51.17	346.19	852.03	340.81	169.12
16	25.00	26.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	25.75	26.50	213.75	213.75	4.71	51.17	346.19	903.20	361.28	185.10
17	26.50	27.50	1.00	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.00	27.50	213.75	213.75	3.14	35.29	385.91	978.20	391.28	196.08

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
2	22.50	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
3	24.00	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
4	25.50	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
5	27.00	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
6	28.50	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
7	30.00	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-20	-
Chainage	2+541	km
Bottom Depth of pile	27.50	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	239.31	kN/m^2
Pile shaft Length Below cut-off	25.00	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	15.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-20	1.20	22.00	19.50	18.00	377.79	178.98	11.12	2.78
BH-20	1.20	23.50	21.00	19.50	403.80	199.27	11.12	2.78
BH-20	1.20	25.00	22.50	21.00	482.59	220.90	11.12	2.78
BH-20	1.20	26.50	24.00	22.50	510.09	242.52	11.12	2.78
BH-20	1.20	27.50	25.00	23.50	554.70	257.38	11.12	2.78
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	13.31	26.63	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	39.94	53.25	5.65	8.70	50.69	59.39	23.76	11.15
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.56	79.88	5.65	17.14	133.99	159.83	63.93	18.32
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	93.19	106.50	5.65	24.00	173.85	223.70	89.48	27.41
5	8.50	10.00	1.50	Granular	17.75	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	119.81	133.13	5.65	30.86	213.72	294.42	117.77	38.43
6	10.00	11.50	1.50	Granular	18.00	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	146.63	160.13	5.65	37.76	254.35	372.81	149.12	51.38
7	11.50	13.00	1.50	Granular	18.00	0.08	25	-	10.00	10.88	1.00	-	12.25	13.00	173.63	187.13	5.65	42.99	243.34	404.80	161.92	65.79
8	13.00	14.50	1.50	Granular	17.75	0.08	25	-	10.00	10.88	1.00	-	13.75	14.50	200.44	213.75	5.65	49.63	276.05	487.14	194.86	82.06
9	14.50	16.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	15.25	16.00	219.71	225.67	5.65	56.58	344.34	612.01	244.80	100.28
10	16.00	17.50	1.50	Granular	9.09	0.03	26	-	11.90	13.19	1.00	-	16.75	17.50	232.49	239.31	5.65	59.87	365.69	693.24	277.29	119.42
11	17.50	19.00	1.50	Granular	9.09	0.08	26	-	11.90	13.19	1.00	-	18.25	19.00	239.31	239.31	5.65	61.63	365.69	754.87	301.95	139.05
12	19.00	20.50	1.50	Granular	9.09	0.08	26	-	11.90	13.19	1.00	-	19.75	20.50	239.31	239.31	5.65	61.63	365.69	816.49	326.60	158.68
13	20.50	22.00	1.50	Granular	9.09	0.07	27	-	13.80	15.50	1.00	-	21.25	22.00	239.31	239.31	5.65	64.00	429.67	944.47	377.79	178.98
14	22.00	23.50	1.50	Granular	10.19	0.07	27	-	13.80	15.50	1.00	-	22.75	23.50	239.31	239.31	5.65	64.00	430.70	1009.50	403.80	199.27
15	23.50	25.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	24.25	25.00	239.31	239.31	5.65	68.74	558.94	1206.48	482.59	220.90
16	25.00	26.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	25.75	26.50	239.31	239.31	5.65	68.74	558.94	1275.22	510.09	242.52
17	26.50	27.50	1.00	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.00	27.50	239.31	239.31	3.77	47.41	623.06	1386.74	554.70	257.38

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
2	22.50	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
3	24.00	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
4	25.50	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
5	27.00	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
6	28.50	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
7	30.00	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-20A	-
Chainage	2+514	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	207.67	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	13.90	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-20A	1.00	22.00	19.50	16.50	317.86	141.65	11.45	2.86
BH-20A	1.00	23.50	21.00	18.00	338.43	157.70	11.80	2.95
BH-20A	1.00	25.00	22.50	19.50	358.99	173.74	12.15	3.04
BH-20A	1.00	26.50	24.00	21.00	379.56	189.79	12.15	3.04
BH-20A	1.00	28.00	25.50	22.50	400.13	205.84	12.49	3.12
BH-20A	1.00	29.50	27.00	24.00	420.70	221.89	12.82	3.21
BH-20A	1.00	30.00	27.50	24.50	427.56	227.24	13.16	3.29

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.07	21	-	2.00	6.49	1.00	-	3.25	4.00	12.60	25.20	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.75	0.07	21	-	2.00	6.49	1.00	-	4.75	5.50	38.51	51.83	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	65.14	78.45	4.71	13.98	89.90	103.88	41.55	11.61
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	91.76	105.08	4.71	19.69	117.58	151.26	60.50	18.77
5	8.50	10.00	1.50	Granular	19.10	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	119.40	133.73	4.71	24.64	122.21	180.52	72.21	27.32
6	10.00	11.50	1.50	Granular	19.10	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	148.05	162.38	4.71	30.55	146.78	235.64	94.26	37.53
7	11.50	13.00	1.50	Granular	20.00	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	177.38	192.38	4.71	40.99	282.53	412.39	164.95	50.65
8	13.00	14.50	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	200.02	207.67	4.71	46.23	297.93	474.02	189.61	65.25
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	207.67	207.67	4.71	49.71	336.54	562.34	224.93	80.82
10	16.00	17.50	1.50	Granular	8.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	207.67	207.67	4.71	49.71	335.15	610.66	244.26	96.38
11	17.50	19.00	1.50	Granular	8.19	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	207.67	207.67	4.71	46.28	258.24	580.02	232.01	110.99
12	19.00	20.50	1.50	Granular	10.19	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	207.67	207.67	4.71	46.28	259.32	627.39	250.96	125.60
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	207.67	207.67	4.71	51.42	375.15	794.64	317.86	141.65
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	207.67	207.67	4.71	51.42	375.15	846.06	338.43	157.70
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	207.67	207.67	4.71	51.42	375.15	897.49	358.99	173.74
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	207.67	207.67	4.71	51.42	375.15	948.91	379.56	189.79
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	207.67	207.67	4.71	51.42	375.15	1000.33	400.13	205.84
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	207.67	207.67	4.71	51.42	375.15	1051.76	420.70	221.89
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	207.67	207.67	1.57	17.14	375.15	1068.90	427.56	227.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
6	28.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
7	30.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-20A	-
Chainage	2+514	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	13.90	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-20A	1.20	22.00	19.50	16.50	458.96	184.55	14.88	3.72
BH-20A	1.20	23.50	21.00	18.00	486.92	206.50	15.33	3.83
BH-20A	1.20	25.00	22.50	19.50	514.89	228.44	15.78	3.95
BH-20A	1.20	26.50	24.00	21.00	542.85	250.39	15.78	3.95
BH-20A	1.20	28.00	25.50	22.50	570.81	272.34	16.23	4.06
BH-20A	1.20	29.50	27.00	24.00	598.77	294.29	16.66	4.17
BH-20A	1.20	30.00	27.50	24.50	608.09	301.60	17.09	4.27

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.07	21	-	2.00	6.49	1.00	-	3.25	4.00	12.60	25.20	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.75	0.07	21	-	2.00	6.49	1.00	-	4.75	5.50	38.51	51.83	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	65.14	78.45	5.65	16.78	131.85	148.63	59.45	15.78
4	7.00	8.50	1.50	Granular	17.75	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	91.76	105.08	5.65	23.63	171.72	212.13	84.85	24.77
5	8.50	10.00	1.50	Granular	19.10	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	119.40	133.73	5.65	29.57	178.15	248.12	99.25	35.43
6	10.00	11.50	1.50	Granular	19.10	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	148.05	162.38	5.65	36.66	213.53	320.16	128.07	48.07
7	11.50	13.00	1.50	Granular	20.00	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	177.38	192.38	5.65	49.19	410.40	566.23	226.49	64.22
8	13.00	14.50	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	200.02	207.67	5.65	55.47	430.84	642.14	256.86	82.12
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	215.31	222.96	5.65	61.85	521.59	794.74	317.89	101.82
10	16.00	17.50	1.50	Granular	8.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	229.10	235.25	5.65	65.81	547.27	886.23	354.49	122.62
11	17.50	19.00	1.50	Granular	8.19	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	235.25	235.25	5.65	62.91	421.68	823.55	329.42	142.61
12	19.00	20.50	1.50	Granular	10.19	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	235.25	235.25	5.65	62.91	423.56	888.34	355.34	162.60
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	235.25	235.25	5.65	69.90	612.72	1147.41	458.96	184.55
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	235.25	235.25	5.65	69.90	612.72	1217.31	486.92	206.50
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	235.25	235.25	5.65	69.90	612.72	1287.21	514.89	228.44
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	235.25	235.25	5.65	69.90	612.72	1357.12	542.85	250.39
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	235.25	235.25	5.65	69.90	612.72	1427.02	570.81	272.34
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	235.25	235.25	5.65	69.90	612.72	1496.93	598.77	294.29
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	235.25	235.25	1.88	23.30	612.72	1520.23	608.09	301.60

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
6	28.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
7	30.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-11	-
Chainage	1+610	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.92	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-11	1.00	22.00	19.50	18.00	155.35	81.75	11.13	2.78
BH-11	1.00	23.50	21.00	19.50	165.15	90.26	11.45	2.86
BH-11	1.00	25.00	22.50	21.00	174.95	98.77	11.72	2.93
BH-11	1.00	26.50	24.00	22.50	184.75	107.28	11.94	2.99
BH-11	1.00	28.00	25.50	24.00	194.55	115.78	12.13	3.03
BH-11	1.00	29.50	27.00	25.50	204.34	124.29	12.28	3.07
BH-11	1.00	30.00	27.50	26.00	207.61	127.13	12.41	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	16.19	21.58	4.71	3.07	16.47	19.55	7.82	6.91
3	5.50	7.00	1.50	Granular	7.19	0.02	26	-	11.90	13.19	1.00	-	6.25	7.00	26.98	32.37	4.71	5.79	37.03	45.89	18.36	10.18
4	7.00	8.50	1.50	Granular	7.19	0.02	26	-	11.90	13.19	1.00	-	7.75	8.50	37.77	43.16	4.71	8.10	48.25	65.22	26.09	14.10
5	8.50	10.00	1.50	Granular	9.29	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	50.13	57.10	4.71	11.17	74.83	102.97	41.19	18.87
6	10.00	11.50	1.50	Granular	9.29	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	64.07	71.04	4.71	14.28	91.87	134.29	53.72	24.52
7	11.50	13.00	1.50	Granular	9.29	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	78.01	84.98	4.71	18.67	141.27	202.36	80.94	31.40
8	13.00	14.50	1.50	Granular	9.29	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	91.95	98.92	4.71	22.01	163.39	246.49	98.60	39.21
9	14.50	16.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	15.25	16.00	98.92	98.92	4.71	24.50	182.80	290.40	116.16	47.72
10	16.00	17.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	16.75	17.50	98.92	98.92	4.71	24.50	182.80	314.89	125.96	56.23
11	17.50	19.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	18.25	19.00	98.92	98.92	4.71	24.50	182.80	339.39	135.76	64.74
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	98.92	98.92	4.71	24.50	182.80	363.89	145.55	73.24
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	98.92	98.92	4.71	24.50	182.80	388.38	155.35	81.75
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	98.92	98.92	4.71	24.50	182.80	412.88	165.15	90.26
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	98.92	98.92	4.71	24.50	182.80	437.37	174.95	98.77
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	98.92	98.92	4.71	24.50	182.80	461.87	184.75	107.28
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	98.92	98.92	4.71	24.50	182.80	486.36	194.55	115.78
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	98.92	98.92	4.71	24.50	182.80	510.86	204.34	124.29
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	98.92	98.92	1.57	8.17	182.80	519.02	207.61	127.13

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.16E+03	3.41	1.17	2.00	1.83	6.80	6.23	0.180	0.719	11.13	2.78	37.84	17.33	26.71	6.68	90.81	41.58
2	22.50	23	2.96E+07	4.91E-02	3.30E+03	3.38	1.18	1.99	1.83	6.74	6.17	0.175	0.699	11.45	2.86	38.57	17.67	27.49	6.87	92.56	42.40
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.68	6.13	0.171	0.683	11.72	2.93	39.16	17.94	28.12	7.03	93.98	43.06
4	25.50	25	2.96E+07	4.91E-02	3.53E+03	3.33	1.20	1.99	1.83	6.64	6.09	0.167	0.670	11.94	2.99	39.66	18.18	28.66	7.17	95.18	43.63
5	27.00	25	2.96E+07	4.91E-02	3.61E+03	3.32	1.21	1.99	1.83	6.61	6.06	0.165	0.660	12.13	3.03	40.07	18.37	29.10	7.28	96.16	44.08
6	28.50	26	2.96E+07	4.91E-02	3.69E+03	3.30	1.21	1.99	1.83	6.58	6.03	0.163	0.651	12.28	3.07	40.41	18.53	29.48	7.37	96.99	44.47
7	30.00	26	2.96E+07	4.91E-02	3.75E+03	3.29	1.21	1.99	1.83	6.56	6.01	0.161	0.645	12.41	3.10	40.69	18.66	29.79	7.45	97.66	44.79

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-11	-
Chainage	1+610	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	129.50	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-11	1.20	22.00	19.50	18.00	250.57	114.09	14.48	3.62
BH-11	1.20	23.50	21.00	19.50	265.96	127.24	14.90	3.73
BH-11	1.20	25.00	22.50	21.00	281.35	140.39	15.24	3.81
BH-11	1.20	26.50	24.00	22.50	296.75	153.54	15.54	3.88
BH-11	1.20	28.00	25.50	24.00	312.14	166.69	15.78	3.94
BH-11	1.20	29.50	27.00	25.50	327.53	179.84	15.98	4.00
BH-11	1.20	30.00	27.50	26.00	332.66	184.22	16.15	4.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	16.19	21.58	5.65	3.69	24.21	27.90	11.16	9.74
3	5.50	7.00	1.50	Granular	7.19	0.02	26	-	11.90	13.19	1.00	-	6.25	7.00	26.98	32.37	5.65	6.95	54.30	64.93	25.97	14.06
4	7.00	8.50	1.50	Granular	7.19	0.02	26	-	11.90	13.19	1.00	-	7.75	8.50	37.77	43.16	5.65	9.73	70.46	90.82	36.33	19.16
5	8.50	10.00	1.50	Granular	9.29	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	50.13	57.10	5.65	13.41	109.22	142.98	57.19	25.29
6	10.00	11.50	1.50	Granular	9.29	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	64.07	71.04	5.65	17.13	133.75	184.65	73.86	32.46
7	11.50	13.00	1.50	Granular	9.29	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	78.01	84.98	5.65	22.41	205.29	278.60	111.44	41.11
8	13.00	14.50	1.50	Granular	9.29	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	91.95	98.92	5.65	26.41	237.13	336.86	134.74	50.88
9	14.50	16.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	15.25	16.00	106.57	114.21	5.65	31.67	304.43	435.82	174.33	62.12
10	16.00	17.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	16.75	17.50	121.86	129.50	5.65	36.21	343.38	510.98	204.39	74.64
11	17.50	19.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	18.25	19.00	129.50	129.50	5.65	38.48	343.38	549.46	219.78	87.79
12	19.00	20.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	129.50	129.50	5.65	38.48	343.38	587.94	235.18	100.94
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	129.50	129.50	5.65	38.48	343.38	626.42	250.57	114.09
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	129.50	129.50	5.65	38.48	343.38	664.90	265.96	127.24
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	129.50	129.50	5.65	38.48	343.38	703.39	281.35	140.39
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	129.50	129.50	5.65	38.48	343.38	741.87	296.75	153.54
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	129.50	129.50	5.65	38.48	343.38	780.35	312.14	166.69
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	129.50	129.50	5.65	38.48	343.38	818.83	327.53	179.84
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	129.50	129.50	1.88	12.83	343.38	831.66	332.66	184.22

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.16E+03	3.94	1.01	2.01	1.83	7.94	7.23	0.138	0.552	14.48	3.62	57.51	26.17	34.76	8.69	138.02	62.81
2	22.50	23	2.96E+07	1.02E-01	3.30E+03	3.91	1.02	2.01	1.83	7.87	7.16	0.134	0.537	14.90	3.73	58.61	26.68	35.76	8.94	140.67	64.04
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.24	3.81	59.51	27.10	36.59	9.15	142.83	65.04
4	25.50	25	2.96E+07	1.02E-01	3.53E+03	3.86	1.04	2.01	1.83	7.76	7.07	0.129	0.515	15.54	3.88	60.27	27.45	37.29	9.32	144.64	65.88
5	27.00	25	2.96E+07	1.02E-01	3.61E+03	3.84	1.04	2.01	1.83	7.72	7.03	0.127	0.507	15.78	3.94	60.89	27.74	37.86	9.47	146.13	66.57
6	28.50	26	2.96E+07	1.02E-01	3.69E+03	3.82	1.05	2.01	1.83	7.69	7.00	0.125	0.501	15.98	4.00	61.41	27.98	38.35	9.59	147.39	67.16
7	30.00	26	2.96E+07	1.02E-01	3.75E+03	3.81	1.05	2.01	1.83	7.66	6.98	0.124	0.496	16.15	4.04	61.83	28.18	38.75	9.69	148.40	67.63

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-12	-
Chainage	1+745	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	92.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-12	1.00	22.00	19.50	15.00	141.74	75.49	11.04	2.76
BH-12	1.00	23.50	21.00	16.50	150.89	83.54	11.52	2.88
BH-12	1.00	25.00	22.50	18.00	160.03	91.59	11.91	2.98
BH-12	1.00	26.50	24.00	19.50	169.17	99.64	12.24	3.06
BH-12	1.00	28.00	25.50	21.00	178.32	107.70	12.52	3.13
BH-12	1.00	29.50	27.00	22.50	187.46	115.75	12.76	3.19
BH-12	1.00	30.00	27.50	23.00	190.51	118.43	12.95	3.24

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	21	-	2.00	6.49	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.69	0.03	21	-	2.00	6.49	1.00	-	4.75	5.50	15.81	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.69	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	27.35	33.12	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.69	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	38.89	44.66	4.71	7.70	36.86	44.56	17.83	11.50
5	8.50	10.00	1.50	Granular	6.59	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	49.61	54.55	4.71	11.46	80.68	99.85	39.94	16.36
6	10.00	11.50	1.50	Granular	6.59	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	59.50	64.44	4.71	13.75	94.57	127.49	51.00	21.86
7	11.50	13.00	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	71.41	78.38	4.71	17.09	130.80	180.81	72.33	28.30
8	13.00	14.50	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	85.35	92.32	4.71	20.43	152.92	223.36	89.34	35.67
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	92.32	92.32	4.71	22.10	153.54	246.08	98.43	43.50
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	92.32	92.32	4.71	22.10	153.54	268.18	107.27	51.34
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	92.32	92.32	4.71	22.86	171.13	308.63	123.45	59.39
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	92.32	92.32	4.71	22.86	171.13	331.49	132.60	67.44
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	92.32	92.32	4.71	22.86	171.13	354.35	141.74	75.49
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	92.32	92.32	4.71	22.86	171.13	377.21	150.89	83.54
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	92.32	92.32	4.71	22.86	171.13	400.08	160.03	91.59
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	92.32	92.32	4.71	22.86	171.13	422.94	169.17	99.64
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	92.32	92.32	4.71	22.86	171.13	445.80	178.32	107.70
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	92.32	92.32	4.71	22.86	171.13	468.66	187.46	115.75
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	92.32	92.32	1.57	7.62	171.13	476.28	190.51	118.43

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.61E+03	3.54	1.98	1.93	1.80	6.82	6.39	0.181	0.724	11.04	2.76	37.64	17.63	26.51	6.63	90.35	42.32
2	22.50	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.174	0.694	11.52	2.88	38.72	18.15	27.65	6.91	92.92	43.55
3	24.00	21	2.96E+07	4.91E-02	2.94E+03	3.46	2.03	1.92	1.80	6.65	6.23	0.168	0.672	11.91	2.98	39.59	18.56	28.59	7.15	95.01	44.55
4	25.50	22	2.96E+07	4.91E-02	3.07E+03	3.43	2.04	1.92	1.80	6.59	6.18	0.163	0.653	12.24	3.06	40.32	18.91	29.38	7.35	96.77	45.39
5	27.00	22	2.96E+07	4.91E-02	3.18E+03	3.40	2.06	1.92	1.80	6.54	6.13	0.160	0.639	12.52	3.13	40.92	19.20	30.05	7.51	98.22	46.08
6	28.50	23	2.96E+07	4.91E-02	3.28E+03	3.38	2.07	1.92	1.80	6.50	6.10	0.157	0.627	12.76	3.19	41.44	19.45	30.61	7.65	99.46	46.67
7	30.00	24	2.96E+07	4.91E-02	3.36E+03	3.37	2.08	1.92	1.80	6.46	6.07	0.154	0.618	12.95	3.24	41.86	19.65	31.08	7.77	100.47	47.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-12	-
Chainage	1+745	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	122.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-12	1.20	22.00	19.50	15.00	232.99	106.49	14.37	3.59
BH-12	1.20	23.50	21.00	16.50	247.60	119.09	14.99	3.75
BH-12	1.20	25.00	22.50	18.00	262.21	131.69	15.50	3.87
BH-12	1.20	26.50	24.00	19.50	276.82	144.29	15.93	3.98
BH-12	1.20	28.00	25.50	21.00	291.43	156.89	16.29	4.07
BH-12	1.20	29.50	27.00	22.50	306.03	169.49	16.60	4.15
BH-12	1.20	30.00	27.50	23.00	310.90	173.69	16.86	4.21

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	21	-	2.00	6.49	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.69	0.03	21	-	2.00	6.49	1.00	-	4.75	5.50	15.81	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.69	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	27.35	33.12	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.69	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	38.89	44.66	5.65	9.25	53.78	63.02	25.21	16.05
5	8.50	10.00	1.50	Granular	6.59	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	49.61	54.55	5.65	13.76	117.36	140.36	56.15	22.27
6	10.00	11.50	1.50	Granular	6.59	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	59.50	64.44	5.65	16.50	137.36	176.86	70.75	29.27
7	11.50	13.00	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	71.41	78.38	5.65	20.51	190.21	250.22	100.09	37.39
8	13.00	14.50	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	85.35	92.32	5.65	24.52	222.06	306.59	122.64	46.63
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	99.97	107.61	5.65	28.71	258.07	371.31	148.53	57.04
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	115.26	122.90	5.65	33.11	293.00	439.35	175.74	68.69
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	122.90	122.90	5.65	36.52	326.57	509.44	203.78	81.29
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	122.90	122.90	5.65	36.52	326.57	545.96	218.39	93.89
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	122.90	122.90	5.65	36.52	326.57	582.48	232.99	106.49
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	122.90	122.90	5.65	36.52	326.57	619.00	247.60	119.09
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	122.90	122.90	5.65	36.52	326.57	655.52	262.21	131.69
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	122.90	122.90	5.65	36.52	326.57	692.05	276.82	144.29
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	122.90	122.90	5.65	36.52	326.57	728.57	291.43	156.89
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	122.90	122.90	5.65	36.52	326.57	765.09	306.03	169.49
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	122.90	122.90	1.88	12.17	326.57	777.26	310.90	173.69

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.61E+03	4.09	1.71	1.94	1.81	7.96	7.42	0.139	0.557	14.37	3.59	57.20	26.63	34.48	8.62	137.28	63.92
2	22.50	20	2.96E+07	1.02E-01	2.79E+03	4.04	1.73	1.94	1.81	7.85	7.32	0.133	0.534	14.99	3.75	58.84	27.41	35.97	8.99	141.21	65.78
3	24.00	21	2.96E+07	1.02E-01	2.94E+03	4.00	1.75	1.94	1.81	7.76	7.24	0.129	0.516	15.50	3.87	60.17	28.04	37.19	9.30	144.40	67.30
4	25.50	22	2.96E+07	1.02E-01	3.07E+03	3.96	1.77	1.94	1.81	7.69	7.17	0.126	0.502	15.93	3.98	61.28	28.57	38.23	9.56	147.08	68.58
5	27.00	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.78	1.94	1.81	7.64	7.12	0.123	0.491	16.29	4.07	62.21	29.01	39.10	9.78	149.30	69.63
6	28.50	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.79	1.94	1.81	7.59	7.08	0.120	0.482	16.60	4.15	62.99	29.39	39.84	9.96	151.18	70.53
7	30.00	24	2.96E+07	1.02E-01	3.36E+03	3.90	1.80	1.94	1.81	7.55	7.05	0.119	0.475	16.86	4.21	63.64	29.69	40.46	10.11	152.73	71.26

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-13	-
Chainage	1+859	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	105.07	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-13	1.00	22.00	19.50	18.00	164.48	85.10	11.19	2.80
BH-13	1.00	23.50	21.00	19.50	174.89	94.03	11.50	2.88
BH-13	1.00	25.00	22.50	21.00	185.30	102.97	11.76	2.94
BH-13	1.00	26.50	24.00	22.50	195.70	111.90	11.98	2.99
BH-13	1.00	28.00	25.50	24.00	206.11	120.84	12.16	3.04
BH-13	1.00	29.50	27.00	25.50	216.52	129.77	12.31	3.08
BH-13	1.00	30.00	27.50	26.00	219.99	132.75	12.43	3.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.19	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	16.94	23.08	4.71	3.49	23.02	26.52	10.61	7.03
3	5.50	7.00	1.50	Granular	8.19	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	29.23	35.37	4.71	6.27	40.62	50.39	20.16	10.43
4	7.00	8.50	1.50	Granular	9.29	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	42.34	49.31	4.71	9.09	55.63	74.49	29.79	14.63
5	8.50	10.00	1.50	Granular	9.29	0.04	27	-	13.80	15.50	1.00	-	9.25	10.00	56.28	63.25	4.71	12.54	82.35	113.75	45.50	19.79
6	10.00	11.50	1.50	Granular	9.29	0.04	27	-	13.80	15.50	1.00	-	10.75	11.50	70.22	77.19	4.71	15.65	99.39	146.43	58.57	25.82
7	11.50	13.00	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	84.16	91.13	4.71	19.45	133.72	200.22	80.09	32.91
8	13.00	14.50	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	98.10	105.07	4.71	22.67	153.30	242.47	96.99	40.91
9	14.50	16.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	105.07	105.07	4.71	25.15	173.77	288.09	115.24	49.60
10	16.00	17.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	105.07	105.07	4.71	25.15	173.77	313.24	125.30	58.29
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	105.07	105.07	4.71	26.02	193.68	359.17	143.67	67.23
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	105.07	105.07	4.71	26.02	193.68	385.19	154.08	76.16
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	105.07	105.07	4.71	26.02	193.68	411.21	164.48	85.10
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	105.07	105.07	4.71	26.02	193.68	437.23	174.89	94.03
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	105.07	105.07	4.71	26.02	193.68	463.24	185.30	102.97
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	105.07	105.07	4.71	26.02	193.68	489.26	195.70	111.90
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	105.07	105.07	4.71	26.02	193.68	515.28	206.11	120.84
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	105.07	105.07	4.71	26.02	193.68	541.30	216.52	129.77
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	105.07	105.07	1.57	8.67	193.68	549.97	219.99	132.75

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.18	1.99	1.83	6.79	6.22	0.179	0.715	11.19	2.80	37.97	17.39	26.86	6.71	91.14	41.74
2	22.50	23	2.96E+07	4.91E-02	3.33E+03	3.37	1.19	1.99	1.83	6.73	6.16	0.174	0.695	11.50	2.88	38.68	17.72	27.61	6.90	92.84	42.53
3	24.00	24	2.96E+07	4.91E-02	3.44E+03	3.35	1.19	1.99	1.83	6.68	6.12	0.170	0.680	11.76	2.94	39.25	17.99	28.22	7.06	94.21	43.17
4	25.50	25	2.96E+07	4.91E-02	3.54E+03	3.33	1.20	1.99	1.83	6.64	6.08	0.167	0.668	11.98	2.99	39.74	18.21	28.75	7.19	95.37	43.72
5	27.00	25	2.96E+07	4.91E-02	3.63E+03	3.32	1.21	1.99	1.83	6.60	6.05	0.165	0.658	12.16	3.04	40.13	18.40	29.18	7.29	96.32	44.16
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.58	6.03	0.162	0.650	12.31	3.08	40.47	18.56	29.54	7.39	97.12	44.53
7	30.00	26	2.96E+07	4.91E-02	3.75E+03	3.29	1.21	1.99	1.83	6.55	6.01	0.161	0.644	12.43	3.11	40.73	18.68	29.83	7.46	97.75	44.83

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-13	-
Chainage	1+859	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	135.65	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-13	1.20	22.00	19.50	18.00	262.45	118.02	14.56	3.64
BH-13	1.20	23.50	21.00	19.50	278.57	131.68	14.97	3.74
BH-13	1.20	25.00	22.50	21.00	294.70	145.34	15.30	3.83
BH-13	1.20	26.50	24.00	22.50	310.82	159.00	15.58	3.90
BH-13	1.20	28.00	25.50	24.00	326.94	172.66	15.81	3.95
BH-13	1.20	29.50	27.00	25.50	343.07	186.32	16.01	4.00
BH-13	1.20	30.00	27.50	26.00	348.44	190.88	16.17	4.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.19	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	16.94	23.08	5.65	4.19	34.08	38.28	15.31	9.88
3	5.50	7.00	1.50	Granular	8.19	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	29.23	35.37	5.65	7.53	59.60	71.32	28.53	14.37
4	7.00	8.50	1.50	Granular	9.29	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	42.34	49.31	5.65	10.90	81.37	103.99	41.60	19.79
5	8.50	10.00	1.50	Granular	9.29	0.04	27	-	13.80	15.50	1.00	-	9.25	10.00	56.28	63.25	5.65	15.05	120.04	157.72	63.09	26.38
6	10.00	11.50	1.50	Granular	9.29	0.04	27	-	13.80	15.50	1.00	-	10.75	11.50	70.22	77.19	5.65	18.78	144.57	201.03	80.41	34.02
7	11.50	13.00	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	84.16	91.13	5.65	23.34	194.22	274.02	109.61	42.93
8	13.00	14.50	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	98.10	105.07	5.65	27.21	222.41	329.41	131.77	52.92
9	14.50	16.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	112.72	120.36	5.65	32.38	287.19	426.58	170.63	64.36
10	16.00	17.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	128.01	135.65	5.65	36.77	322.13	498.28	199.31	77.03
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	135.65	135.65	5.65	40.31	359.04	575.50	230.20	90.69
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	135.65	135.65	5.65	40.31	359.04	615.81	246.32	104.35
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	135.65	135.65	5.65	40.31	359.04	656.12	262.45	118.02
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	135.65	135.65	5.65	40.31	359.04	696.43	278.57	131.68
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	135.65	135.65	5.65	40.31	359.04	736.74	294.70	145.34
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	135.65	135.65	5.65	40.31	359.04	777.05	310.82	159.00
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	135.65	135.65	5.65	40.31	359.04	817.36	326.94	172.66
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	135.65	135.65	5.65	40.31	359.04	857.67	343.07	186.32
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	135.65	135.65	1.88	13.44	359.04	871.10	348.44	190.88

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.02	2.01	1.83	7.93	7.22	0.137	0.549	14.56	3.64	57.72	26.27	34.95	8.74	138.52	63.04
2	22.50	23	2.96E+07	1.02E-01	3.33E+03	3.90	1.02	2.01	1.83	7.86	7.15	0.134	0.534	14.97	3.74	58.79	26.76	35.92	8.98	141.09	64.23
3	24.00	24	2.96E+07	1.02E-01	3.44E+03	3.88	1.03	2.01	1.83	7.80	7.10	0.131	0.523	15.30	3.83	59.66	27.17	36.72	9.18	143.17	65.20
4	25.50	25	2.96E+07	1.02E-01	3.54E+03	3.85	1.04	2.01	1.83	7.75	7.06	0.128	0.513	15.58	3.90	60.39	27.51	37.40	9.35	144.93	66.02
5	27.00	25	2.96E+07	1.02E-01	3.63E+03	3.84	1.04	2.01	1.83	7.71	7.03	0.126	0.506	15.81	3.95	60.99	27.78	37.96	9.49	146.36	66.68
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.500	16.01	4.00	61.49	28.02	38.43	9.61	147.58	67.25
7	30.00	26	2.96E+07	1.02E-01	3.75E+03	3.81	1.05	2.01	1.83	7.66	6.98	0.124	0.495	16.17	4.04	61.89	28.21	38.81	9.70	148.54	67.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-14	-
Chainage	1+952	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	99.75	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-14	1.00	22.00	19.50	15.00	144.91	74.04	10.83	2.71
BH-14	1.00	23.50	21.00	16.50	154.79	82.60	11.24	2.81
BH-14	1.00	25.00	22.50	18.00	164.67	91.17	11.66	2.91
BH-14	1.00	26.50	24.00	19.50	174.55	99.73	12.01	3.00
BH-14	1.00	28.00	25.50	21.00	184.43	108.30	12.30	3.08
BH-14	1.00	29.50	27.00	22.50	194.31	116.86	12.56	3.14
BH-14	1.00	30.00	27.50	23.00	197.60	119.72	12.76	3.19

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.05	26	-	11.90	13.19	1.00	-	3.25	4.00	6.15	12.29	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.94	0.05	26	-	11.90	13.19	1.00	-	4.75	5.50	18.25	24.21	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	30.16	36.12	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	42.08	48.04	4.71	9.03	53.67	62.70	25.08	11.87
5	8.50	10.00	1.50	Granular	7.94	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	53.99	59.95	4.71	0.00	54.54	63.57	25.43	13.52
6	10.00	11.50	1.50	Granular	7.94	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	65.91	71.87	4.71	13.60	64.76	87.39	34.96	18.98
7	11.50	13.00	1.50	Granular	9.29	0.04	26	-	11.90	13.19	1.00	-	12.25	13.00	78.84	85.81	4.71	16.92	93.58	133.13	53.25	25.37
8	13.00	14.50	1.50	Granular	9.29	0.04	26	-	11.90	13.19	1.00	-	13.75	14.50	92.78	99.75	4.71	19.91	108.08	167.54	67.01	32.59
9	14.50	16.00	1.50	Granular	10.19	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	99.75	99.75	4.71	23.05	146.38	228.89	91.56	40.70
10	16.00	17.50	1.50	Granular	10.19	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	99.75	99.75	4.71	23.05	146.38	251.95	100.78	48.80
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	99.75	99.75	4.71	23.88	165.32	294.76	117.91	57.14
12	19.00	20.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	99.75	99.75	4.71	23.88	165.32	318.64	127.46	65.47
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	99.75	99.75	4.71	24.70	184.26	362.28	144.91	74.04
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	99.75	99.75	4.71	24.70	184.26	386.98	154.79	82.60
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	99.75	99.75	4.71	24.70	184.26	411.68	164.67	91.17
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	99.75	99.75	4.71	24.70	184.26	436.38	174.55	99.73
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	99.75	99.75	4.71	24.70	184.26	461.08	184.43	108.30
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	99.75	99.75	4.71	24.70	184.26	485.78	194.31	116.86
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	99.75	99.75	1.57	8.23	184.26	494.01	197.60	119.72

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.54E+03	3.56	1.97	1.93	1.80	6.86	6.43	0.185	0.738	10.83	2.71	37.17	17.41	26.00	6.50	89.20	41.77
2	22.50	19	2.96E+07	4.91E-02	2.69E+03	3.52	1.99	1.93	1.80	6.78	6.35	0.178	0.712	11.24	2.81	38.09	17.85	26.98	6.75	91.42	42.84
3	24.00	20	2.96E+07	4.91E-02	2.85E+03	3.48	2.01	1.92	1.80	6.70	6.28	0.172	0.686	11.66	2.91	39.02	18.29	27.98	6.99	93.66	43.90
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.167	0.666	12.01	3.00	39.81	18.67	28.82	7.21	95.54	44.80
5	27.00	22	2.96E+07	4.91E-02	3.10E+03	3.42	2.05	1.92	1.80	6.58	6.17	0.163	0.650	12.30	3.08	40.45	18.98	29.53	7.38	97.09	45.54
6	28.50	22	2.96E+07	4.91E-02	3.20E+03	3.40	2.06	1.92	1.80	6.53	6.13	0.159	0.637	12.56	3.14	41.00	19.24	30.13	7.53	98.41	46.17
7	30.00	23	2.96E+07	4.91E-02	3.28E+03	3.38	2.07	1.92	1.80	6.50	6.10	0.157	0.627	12.76	3.19	41.46	19.46	30.63	7.66	99.50	46.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-14	-
Chainage	1+952	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	130.33	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-14	1.20	22.00	19.50	15.00	237.70	104.49	14.09	3.52
BH-14	1.20	23.50	21.00	16.50	253.19	117.71	14.62	3.66
BH-14	1.20	25.00	22.50	18.00	268.68	130.92	15.17	3.79
BH-14	1.20	26.50	24.00	19.50	284.17	144.14	15.63	3.91
BH-14	1.20	28.00	25.50	21.00	299.66	157.36	16.01	4.00
BH-14	1.20	29.50	27.00	22.50	315.15	170.58	16.34	4.09
BH-14	1.20	30.00	27.50	23.00	320.31	174.99	16.61	4.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.05	26	-	11.90	13.19	1.00	-	3.25	4.00	6.15	12.29	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.94	0.05	26	-	11.90	13.19	1.00	-	4.75	5.50	18.25	24.21	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	30.16	36.12	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	42.08	48.04	5.65	10.84	78.36	89.20	35.68	16.49
5	8.50	10.00	1.50	Granular	7.94	0.02	25	-	10.00	10.88	1.00	-	9.25	10.00	53.99	59.95	5.65	0.00	79.44	90.28	36.11	18.87
6	10.00	11.50	1.50	Granular	7.94	0.02	25	-	10.00	10.88	1.00	-	10.75	11.50	65.91	71.87	5.65	16.32	94.16	121.31	48.53	25.81
7	11.50	13.00	1.50	Granular	9.29	0.04	26	-	11.90	13.19	1.00	-	12.25	13.00	78.84	85.81	5.65	20.30	136.01	183.47	73.39	33.87
8	13.00	14.50	1.50	Granular	9.29	0.04	26	-	11.90	13.19	1.00	-	13.75	14.50	92.78	99.75	5.65	23.89	156.89	228.24	91.30	42.94
9	14.50	16.00	1.50	Granular	10.19	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	107.39	115.04	5.65	29.78	243.52	344.66	137.86	53.65
10	16.00	17.50	1.50	Granular	10.19	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	122.68	130.33	5.65	34.02	274.44	409.60	163.84	65.55
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	130.33	130.33	5.65	37.44	309.96	482.56	193.02	78.41
12	19.00	20.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	130.33	130.33	5.65	37.44	309.96	519.99	208.00	91.27
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	130.33	130.33	5.65	38.73	345.48	594.24	237.70	104.49
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	130.33	130.33	5.65	38.73	345.48	632.97	253.19	117.71
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	130.33	130.33	5.65	38.73	345.48	671.69	268.68	130.92
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	130.33	130.33	5.65	38.73	345.48	710.42	284.17	144.14
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	130.33	130.33	5.65	38.73	345.48	749.15	299.66	157.36
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	130.33	130.33	5.65	38.73	345.48	787.87	315.15	170.58
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	130.33	130.33	1.88	12.91	345.48	800.78	320.31	174.99

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.54E+03	4.12	1.70	1.95	1.81	8.02	7.46	0.142	0.568	14.09	3.52	56.47	26.28	33.82	8.45	135.53	63.08
2	22.50	19	2.96E+07	1.02E-01	2.69E+03	4.07	1.72	1.94	1.81	7.92	7.37	0.137	0.547	14.62	3.66	57.88	26.96	35.10	8.77	138.92	64.70
3	24.00	20	2.96E+07	1.02E-01	2.85E+03	4.03	1.74	1.94	1.81	7.82	7.29	0.132	0.528	15.17	3.79	59.30	27.63	36.40	9.10	142.33	66.32
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.75	1.94	1.81	7.74	7.22	0.128	0.512	15.63	3.91	60.50	28.20	37.50	9.38	145.20	67.68
5	27.00	22	2.96E+07	1.02E-01	3.10E+03	3.96	1.77	1.94	1.81	7.68	7.16	0.125	0.500	16.01	4.00	61.49	28.67	38.42	9.61	147.57	68.81
6	28.50	22	2.96E+07	1.02E-01	3.20E+03	3.93	1.78	1.94	1.81	7.63	7.12	0.122	0.490	16.34	4.09	62.33	29.07	39.22	9.80	149.59	69.77
7	30.00	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.79	1.94	1.81	7.59	7.08	0.120	0.482	16.61	4.15	63.02	29.40	39.87	9.97	151.25	70.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-15	-
Chainage	2+035	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.00	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-15	1.00	22.00	19.50	18.00	159.74	83.30	10.35	2.59
BH-15	1.00	23.50	21.00	19.50	169.84	92.02	10.53	2.63
BH-15	1.00	25.00	22.50	21.00	179.94	100.74	10.73	2.68
BH-15	1.00	26.50	24.00	22.50	190.05	109.46	10.95	2.74
BH-15	1.00	28.00	25.50	24.00	200.15	118.19	11.20	2.80
BH-15	1.00	29.50	27.00	25.50	210.25	126.91	11.41	2.85
BH-15	1.00	30.00	27.50	26.00	213.62	129.81	11.59	2.90

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.07	24	-	8.00	9.78	1.00	-	3.25	4.00	5.25	10.49	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.94	0.07	24	-	8.00	9.78	1.00	-	4.75	5.50	16.45	22.41	4.71	3.26	19.78	23.04	9.22	6.96
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	28.36	34.32	4.71	6.09	39.41	48.76	19.50	10.31
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	40.28	46.24	4.71	8.64	51.80	69.79	27.92	14.38
5	8.50	10.00	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	53.21	60.18	4.71	12.30	90.25	120.54	48.22	19.48
6	10.00	11.50	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	67.15	74.12	4.71	15.52	109.83	155.64	62.25	25.47
7	11.50	13.00	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	81.09	88.06	4.71	18.74	129.41	193.95	77.58	32.37
8	13.00	14.50	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	95.03	102.00	4.71	21.96	148.98	235.49	94.20	40.17
9	14.50	16.00	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	102.00	102.00	4.71	24.42	168.27	279.19	111.68	48.65
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	102.00	102.00	4.71	24.42	168.89	304.23	121.69	57.14
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	102.00	102.00	4.71	25.26	188.24	348.83	139.53	65.86
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	102.00	102.00	4.71	25.26	188.24	374.09	149.64	74.58
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	102.00	102.00	4.71	25.26	188.24	399.35	159.74	83.30
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	102.00	102.00	4.71	25.26	188.24	424.61	169.84	92.02
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	102.00	102.00	4.71	25.26	188.24	449.86	179.94	100.74
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	102.00	102.00	4.71	25.26	188.24	475.12	190.05	109.46
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	102.00	102.00	4.71	25.26	188.24	500.38	200.15	118.19
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	102.00	102.00	4.71	25.26	188.24	525.63	210.25	126.91
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	102.00	102.00	1.57	8.42	188.24	534.05	213.62	129.81

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.15	2.00	1.83	6.97	6.37	0.193	0.773	10.35	2.59	36.06	16.49	24.85	6.21	86.53	39.59
2	22.50	20	2.96E+07	4.91E-02	2.90E+03	3.47	1.15	2.00	1.83	6.93	6.34	0.190	0.760	10.53	2.63	36.46	16.68	25.26	6.32	87.50	40.04
3	24.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.746	10.73	2.68	36.92	16.90	25.74	6.44	88.60	40.55
4	25.50	22	2.96E+07	4.91E-02	3.08E+03	3.42	1.17	2.00	1.83	6.84	6.26	0.183	0.730	10.95	2.74	37.44	17.14	26.29	6.57	89.86	41.14
5	27.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.18	1.99	1.83	6.78	6.21	0.179	0.714	11.20	2.80	38.00	17.40	26.88	6.72	91.21	41.77
6	28.50	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.18	1.99	1.83	6.74	6.18	0.175	0.701	11.41	2.85	38.48	17.63	27.40	6.85	92.36	42.31
7	30.00	24	2.96E+07	4.91E-02	3.37E+03	3.37	1.19	1.99	1.83	6.71	6.15	0.173	0.690	11.59	2.90	38.87	17.81	27.82	6.95	93.30	42.75

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-15	-
Chainage	2+035	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	131.23	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-15	1.20	22.00	19.50	18.00	254.14	115.36	13.47	3.37
BH-15	1.20	23.50	21.00	19.50	269.74	128.65	13.70	3.43
BH-15	1.20	25.00	22.50	21.00	285.34	141.95	13.96	3.49
BH-15	1.20	26.50	24.00	22.50	300.94	155.24	14.26	3.56
BH-15	1.20	28.00	25.50	24.00	316.54	168.53	14.58	3.64
BH-15	1.20	29.50	27.00	25.50	332.13	181.83	14.85	3.71
BH-15	1.20	30.00	27.50	26.00	337.33	186.26	15.08	3.77

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.07	24	-	8.00	9.78	1.00	-	3.25	4.00	5.25	10.49	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.94	0.07	24	-	8.00	9.78	1.00	-	4.75	5.50	16.45	22.41	5.65	3.91	29.20	33.11	13.25	9.80
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	28.36	34.32	5.65	7.30	57.83	69.04	27.62	14.22
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	40.28	46.24	5.65	10.37	75.67	97.25	38.90	19.50
5	8.50	10.00	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	53.21	60.18	5.65	14.76	131.62	167.97	67.19	26.01
6	10.00	11.50	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	67.15	74.12	5.65	18.62	159.81	214.78	85.91	33.60
7	11.50	13.00	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	81.09	88.06	5.65	22.49	188.00	265.46	106.18	42.27
8	13.00	14.50	1.50	Granular	9.29	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	95.03	102.00	5.65	26.35	216.19	320.00	128.00	52.03
9	14.50	16.00	1.50	Granular	9.29	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	108.97	115.94	5.65	31.30	276.01	411.12	164.45	63.16
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	123.58	131.23	5.65	35.50	312.02	482.62	193.05	75.48
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	131.23	131.23	5.65	38.99	347.77	557.37	222.95	88.77
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	131.23	131.23	5.65	38.99	347.77	596.37	238.55	102.07
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	131.23	131.23	5.65	38.99	347.77	635.36	254.14	115.36
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	131.23	131.23	5.65	38.99	347.77	674.36	269.74	128.65
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	131.23	131.23	5.65	38.99	347.77	713.35	285.34	141.95
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	131.23	131.23	5.65	38.99	347.77	752.34	300.94	155.24
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	131.23	131.23	5.65	38.99	347.77	791.34	316.54	168.53
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	131.23	131.23	5.65	38.99	347.77	830.33	332.13	181.83
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	131.23	131.23	1.88	13.00	347.77	843.33	337.33	186.26

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.82E+03	4.03	0.99	2.02	1.83	8.14	7.40	0.148	0.594	13.47	3.37	54.81	24.92	32.34	8.08	131.54	59.80
2	22.50	20	2.96E+07	1.02E-01	2.90E+03	4.01	1.00	2.02	1.83	8.09	7.36	0.146	0.584	13.70	3.43	55.42	25.20	32.88	8.22	133.01	60.49
3	24.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.96	3.49	56.12	25.52	33.50	8.38	134.68	61.26
4	25.50	22	2.96E+07	1.02E-01	3.08E+03	3.96	1.01	2.01	1.83	7.98	7.27	0.140	0.561	14.26	3.56	56.91	25.89	34.21	8.55	136.58	62.14
5	27.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.02	2.01	1.83	7.93	7.21	0.137	0.549	14.58	3.64	57.76	26.29	34.98	8.75	138.62	63.09
6	28.50	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.02	2.01	1.83	7.88	7.17	0.135	0.539	14.85	3.71	58.49	26.62	35.65	8.91	140.37	63.90
7	30.00	24	2.96E+07	1.02E-01	3.37E+03	3.89	1.03	2.01	1.83	7.84	7.14	0.133	0.531	15.08	3.77	59.08	26.90	36.19	9.05	141.80	64.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-16	-
Chainage	2+135	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	103.20	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-16	1.00	22.00	19.50	15.00	137.23	78.10	11.00	2.75
BH-16	1.00	23.50	21.00	16.50	146.77	86.43	11.27	2.82
BH-16	1.00	25.00	22.50	18.00	156.31	94.76	11.67	2.92
BH-16	1.00	26.50	24.00	19.50	166.13	103.08	12.01	3.00
BH-16	1.00	28.00	25.50	21.00	192.00	111.89	12.28	3.07
BH-16	1.00	29.50	27.00	22.50	202.22	120.69	12.52	3.13
BH-16	1.00	30.00	27.50	23.00	205.63	123.63	12.72	3.18

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.96	11.92	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	17.87	23.83	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.94	0.05	23	-	6.00	8.68	1.00	-	6.25	7.00	29.79	35.75	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.94	0.05	23	-	6.00	8.68	1.00	-	7.75	8.50	41.70	47.66	4.71	7.92	34.50	42.42	16.97	11.56
5	8.50	10.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	53.62	59.58	4.71	11.51	65.67	85.10	34.04	16.43
6	10.00	11.50	1.50	Granular	9.69	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	66.85	74.12	4.71	14.35	81.61	115.38	46.15	22.10
7	11.50	13.00	1.50	Granular	9.69	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	81.39	88.66	4.71	18.14	113.61	165.52	66.21	28.83
8	13.00	14.50	1.50	Granular	9.69	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	95.93	103.20	4.71	21.38	131.38	204.67	81.87	36.46
9	14.50	16.00	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	103.20	103.20	4.71	23.85	150.92	248.05	99.22	44.79
10	16.00	17.50	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	103.20	103.20	4.71	23.85	150.92	271.90	108.76	53.12
11	17.50	19.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	18.25	19.00	103.20	103.20	4.71	23.85	150.92	295.75	118.30	61.45
12	19.00	20.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	19.75	20.50	103.20	103.20	4.71	23.85	150.92	319.60	127.84	69.77
13	20.50	22.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	103.20	103.20	4.71	23.85	150.54	343.08	137.23	78.10
14	22.00	23.50	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	103.20	103.20	4.71	23.85	150.54	366.93	146.77	86.43
15	23.50	25.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	103.20	103.20	4.71	23.85	150.54	390.78	156.31	94.76
16	25.00	26.50	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	25.75	26.50	103.20	103.20	4.71	23.85	151.22	415.31	166.13	103.08
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	103.20	103.20	4.71	25.55	190.36	480.01	192.00	111.89
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	103.20	103.20	4.71	25.55	190.36	505.56	202.22	120.69
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	103.20	103.20	1.57	8.52	190.36	514.08	205.63	123.63

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.60E+03	3.54	1.98	1.93	1.80	6.83	6.39	0.182	0.727	11.00	2.75	37.55	17.59	26.40	6.60	90.11	42.21
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.99	1.93	1.80	6.77	6.35	0.177	0.710	11.27	2.82	38.16	17.88	27.05	6.76	91.58	42.91
3	24.00	20	2.96E+07	4.91E-02	2.85E+03	3.48	2.01	1.92	1.80	6.69	6.28	0.171	0.686	11.67	2.92	39.05	18.30	28.00	7.00	93.72	43.93
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.167	0.666	12.01	3.00	39.80	18.66	28.81	7.20	95.51	44.79
5	27.00	22	2.96E+07	4.91E-02	3.09E+03	3.42	2.04	1.92	1.80	6.58	6.17	0.163	0.651	12.28	3.07	40.41	18.96	29.48	7.37	96.99	45.49
6	28.50	22	2.96E+07	4.91E-02	3.18E+03	3.40	2.06	1.92	1.80	6.54	6.13	0.160	0.639	12.52	3.13	40.94	19.21	30.06	7.51	98.24	46.09
7	30.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	2.07	1.92	1.80	6.50	6.10	0.157	0.629	12.72	3.18	41.36	19.41	30.52	7.63	99.26	46.58

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-16	-
Chainage	2+135	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.28	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-16	1.20	22.00	19.50	15.00	216.21	108.56	14.31	3.58
BH-16	1.20	23.50	21.00	16.50	230.88	121.21	14.66	3.67
BH-16	1.20	25.00	22.50	18.00	245.55	133.85	15.18	3.80
BH-16	1.20	26.50	24.00	19.50	260.70	146.50	15.62	3.91
BH-16	1.20	28.00	25.50	21.00	305.25	159.88	15.99	4.00
BH-16	1.20	29.50	27.00	22.50	320.97	173.26	16.30	4.07
BH-16	1.20	30.00	27.50	23.00	326.21	177.72	16.55	4.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.96	11.92	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	17.87	23.83	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.94	0.05	23	-	6.00	8.68	1.00	-	6.25	7.00	29.79	35.75	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.94	0.05	23	-	6.00	8.68	1.00	-	7.75	8.50	41.70	47.66	5.65	9.50	50.22	59.72	23.89	16.12
5	8.50	10.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	53.62	59.58	5.65	13.81	95.64	118.95	47.58	22.36
6	10.00	11.50	1.50	Granular	9.69	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	66.85	74.12	5.65	17.21	118.83	159.36	63.74	29.56
7	11.50	13.00	1.50	Granular	9.69	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	81.39	88.66	5.65	21.77	165.12	227.41	90.96	38.02
8	13.00	14.50	1.50	Granular	9.69	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	95.93	103.20	5.65	25.65	190.71	278.65	111.46	47.58
9	14.50	16.00	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	110.47	117.74	5.65	30.64	248.45	367.03	146.81	58.54
10	16.00	17.50	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	125.01	132.28	5.65	34.67	277.85	431.10	172.44	70.62
11	17.50	19.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	18.25	19.00	132.28	132.28	5.65	36.69	277.85	467.79	187.11	83.27
12	19.00	20.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	19.75	20.50	132.28	132.28	5.65	36.69	277.85	504.47	201.79	95.91
13	20.50	22.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	132.28	132.28	5.65	36.69	277.21	540.52	216.21	108.56
14	22.00	23.50	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	132.28	132.28	5.65	36.69	277.21	577.20	230.88	121.21
15	23.50	25.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	132.28	132.28	5.65	36.69	277.21	613.89	245.55	133.85
16	25.00	26.50	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	25.75	26.50	132.28	132.28	5.65	36.69	278.39	651.75	260.70	146.50
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	132.28	132.28	5.65	39.31	350.45	763.12	305.25	159.88
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	132.28	132.28	5.65	39.31	350.45	802.42	320.97	173.26
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	132.28	132.28	1.88	13.10	350.45	815.53	326.21	177.72

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.60E+03	4.10	1.71	1.94	1.81	7.97	7.43	0.140	0.559	14.31	3.58	57.05	26.56	34.34	8.59	136.92	63.75
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.72	1.94	1.81	7.91	7.37	0.136	0.546	14.66	3.67	57.98	27.01	35.19	8.80	139.16	64.81
3	24.00	20	2.96E+07	1.02E-01	2.85E+03	4.03	1.74	1.94	1.81	7.82	7.29	0.132	0.527	15.18	3.80	59.34	27.65	36.43	9.11	142.42	66.36
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.75	1.94	1.81	7.74	7.22	0.128	0.512	15.62	3.91	60.49	28.19	37.49	9.37	145.17	67.67
5	27.00	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.77	1.94	1.81	7.68	7.17	0.125	0.500	15.99	4.00	61.42	28.64	38.37	9.59	147.42	68.74
6	28.50	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.78	1.94	1.81	7.64	7.12	0.123	0.491	16.30	4.07	62.22	29.02	39.12	9.78	149.33	69.65
7	30.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.79	1.94	1.81	7.60	7.09	0.121	0.483	16.55	4.14	62.87	29.33	39.73	9.93	150.88	70.38

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-17	-
Chainage	2+230	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	103.42	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-17	1.00	22.00	19.50	18.00	159.97	82.75	11.18	2.79
BH-17	1.00	23.50	21.00	19.50	170.21	91.57	11.38	2.84
BH-17	1.00	25.00	22.50	21.00	180.45	100.39	11.56	2.89
BH-17	1.00	26.50	24.00	22.50	190.70	109.21	11.79	2.95
BH-17	1.00	28.00	25.50	24.00	200.94	118.03	11.97	2.99
BH-17	1.00	29.50	27.00	25.50	211.19	126.85	12.13	3.03
BH-17	1.00	30.00	27.50	26.00	214.60	129.79	12.25	3.06

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.96	11.92	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	17.87	23.83	4.71	3.25	15.50	18.75	7.50	6.96
3	5.50	7.00	1.50	Granular	7.94	0.03	24	-	8.00	9.78	1.00	-	6.25	7.00	29.79	35.75	4.71	5.90	30.07	39.21	15.68	10.26
4	7.00	8.50	1.50	Granular	7.94	0.03	24	-	8.00	9.78	1.00	-	7.75	8.50	41.70	47.66	4.71	8.26	39.25	56.66	22.66	14.22
5	8.50	10.00	1.50	Granular	9.29	0.00	27	-	13.80	15.50	1.00	-	9.25	10.00	54.63	61.60	4.71	12.18	80.33	109.92	43.97	19.28
6	10.00	11.50	1.50	Granular	9.29	0.00	27	-	13.80	15.50	1.00	-	10.75	11.50	68.57	75.54	4.71	15.28	97.37	142.23	56.89	25.21
7	11.50	13.00	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	82.51	89.48	4.71	19.07	131.41	195.34	78.14	32.20
8	13.00	14.50	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	96.45	103.42	4.71	22.29	150.98	237.21	94.88	40.09
9	14.50	16.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	103.42	103.42	4.71	23.90	151.54	261.67	104.67	48.43
10	16.00	17.50	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	103.42	103.42	4.71	23.90	151.54	285.57	114.23	56.77
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	103.42	103.42	4.71	24.76	171.15	329.94	131.98	65.35
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	103.42	103.42	4.71	24.76	171.15	354.69	141.88	73.93
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	103.42	103.42	4.71	25.61	190.76	399.91	159.97	82.75
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	103.42	103.42	4.71	25.61	190.76	425.52	170.21	91.57
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	103.42	103.42	4.71	25.61	190.76	451.13	180.45	100.39
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	103.42	103.42	4.71	25.61	190.76	476.74	190.70	109.21
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	103.42	103.42	4.71	25.61	190.76	502.35	200.94	118.03
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	103.42	103.42	4.71	25.61	190.76	527.96	211.19	126.85
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	103.42	103.42	1.57	8.54	190.76	536.50	214.60	129.79

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.18E+03	3.40	1.18	2.00	1.83	6.79	6.22	0.179	0.716	11.18	2.79	37.95	17.38	26.83	6.71	91.07	41.71
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.84	38.40	17.59	27.31	6.83	92.16	42.21
3	24.00	24	2.96E+07	4.91E-02	3.35E+03	3.37	1.19	1.99	1.83	6.71	6.15	0.173	0.692	11.56	2.89	38.81	17.78	27.75	6.94	93.14	42.67
4	25.50	24	2.96E+07	4.91E-02	3.45E+03	3.35	1.19	1.99	1.83	6.67	6.11	0.170	0.679	11.79	2.95	39.31	18.02	28.29	7.07	94.35	43.24
5	27.00	25	2.96E+07	4.91E-02	3.54E+03	3.33	1.20	1.99	1.83	6.64	6.08	0.167	0.668	11.97	2.99	39.72	18.21	28.73	7.18	95.34	43.70
6	28.50	25	2.96E+07	4.91E-02	3.61E+03	3.32	1.21	1.99	1.83	6.61	6.06	0.165	0.660	12.13	3.03	40.07	18.37	29.11	7.28	96.17	44.09
7	30.00	26	2.96E+07	4.91E-02	3.67E+03	3.31	1.21	1.99	1.83	6.59	6.04	0.163	0.653	12.25	3.06	40.34	18.50	29.41	7.35	96.83	44.40

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-17	-
Chainage	2+230	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	134.00	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-17	1.20	22.00	19.50	18.00	256.38	114.95	14.55	3.64
BH-17	1.20	23.50	21.00	19.50	272.31	128.47	14.80	3.70
BH-17	1.20	25.00	22.50	21.00	288.24	142.00	15.04	3.76
BH-17	1.20	26.50	24.00	22.50	304.17	155.52	15.33	3.83
BH-17	1.20	28.00	25.50	24.00	320.09	169.04	15.57	3.89
BH-17	1.20	29.50	27.00	25.50	336.02	182.57	15.78	3.94
BH-17	1.20	30.00	27.50	26.00	341.33	187.08	15.94	3.99

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.96	11.92	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	17.87	23.83	5.65	3.89	22.68	26.58	10.63	9.80
3	5.50	7.00	1.50	Granular	7.94	0.03	24	-	8.00	9.78	1.00	-	6.25	7.00	29.79	35.75	5.65	7.08	44.02	54.99	22.00	14.16
4	7.00	8.50	1.50	Granular	7.94	0.03	24	-	8.00	9.78	1.00	-	7.75	8.50	41.70	47.66	5.65	9.91	57.24	78.13	31.25	19.31
5	8.50	10.00	1.50	Granular	9.29	0.00	27	-	13.80	15.50	1.00	-	9.25	10.00	54.63	61.60	5.65	14.61	117.14	152.64	61.05	25.77
6	10.00	11.50	1.50	Granular	9.29	0.00	27	-	13.80	15.50	1.00	-	10.75	11.50	68.57	75.54	5.65	18.34	141.67	195.51	78.20	33.28
7	11.50	13.00	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	82.51	89.48	5.65	22.88	190.88	267.60	107.04	42.07
8	13.00	14.50	1.50	Granular	9.29	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	96.45	103.42	5.65	26.75	219.07	322.54	129.02	51.93
9	14.50	16.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	111.07	118.71	5.65	30.80	250.95	385.23	154.09	62.93
10	16.00	17.50	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	126.36	134.00	5.65	35.04	281.87	451.19	180.48	75.12
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	134.00	134.00	5.65	38.49	318.36	526.17	210.47	88.27
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	134.00	134.00	5.65	38.49	318.36	564.66	225.86	101.42
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	134.00	134.00	5.65	39.82	354.84	640.96	256.38	114.95
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	134.00	134.00	5.65	39.82	354.84	680.78	272.31	128.47
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	134.00	134.00	5.65	39.82	354.84	720.60	288.24	142.00
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	134.00	134.00	5.65	39.82	354.84	760.42	304.17	155.52
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	134.00	134.00	5.65	39.82	354.84	800.24	320.09	169.04
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	134.00	134.00	5.65	39.82	354.84	840.05	336.02	182.57
19	29.50	30.00	0.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	134.00	134.00	1.88	13.27	354.84	853.33	341.33	187.08

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.02	2.01	1.83	7.93	7.22	0.138	0.550	14.55	3.64	57.68	26.25	34.91	8.73	138.42	63.00
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.80	3.70	58.36	26.57	35.53	8.88	140.06	63.76
3	24.00	24	2.96E+07	1.02E-01	3.35E+03	3.90	1.03	2.01	1.83	7.84	7.14	0.133	0.532	15.04	3.76	58.98	26.85	36.10	9.03	141.56	64.45
4	25.50	24	2.96E+07	1.02E-01	3.45E+03	3.87	1.03	2.01	1.83	7.79	7.10	0.130	0.522	15.33	3.83	59.75	27.21	36.80	9.20	143.39	65.30
5	27.00	25	2.96E+07	1.02E-01	3.54E+03	3.85	1.04	2.01	1.83	7.75	7.06	0.128	0.514	15.57	3.89	60.37	27.50	37.38	9.34	144.88	65.99
6	28.50	25	2.96E+07	1.02E-01	3.61E+03	3.84	1.04	2.01	1.83	7.72	7.03	0.127	0.507	15.78	3.94	60.89	27.74	37.87	9.47	146.14	66.58
7	30.00	26	2.96E+07	1.02E-01	3.67E+03	3.83	1.05	2.01	1.83	7.69	7.01	0.125	0.502	15.94	3.99	61.31	27.93	38.26	9.56	147.14	67.04

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-18	-
Chainage	2+567	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	95.92	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-18	1.00	22.00	19.50	18.00	113.85	74.69	9.06	2.26
BH-18	1.00	23.50	21.00	19.50	122.09	82.10	9.14	2.29
BH-18	1.00	25.00	22.50	21.00	137.92	89.74	9.23	2.31
BH-18	1.00	26.50	24.00	22.50	146.47	97.37	9.33	2.33
BH-18	1.00	28.00	25.50	24.00	170.22	105.45	9.42	2.36
BH-18	1.00	29.50	27.00	25.50	179.41	113.53	9.56	2.39
BH-18	1.00	30.00	27.50	26.00	189.85	116.29	9.70	2.43

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.69	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	15.06	20.08	4.71	2.86	15.33	18.19	7.27	6.85
3	5.50	7.00	1.50	Granular	8.04	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	26.11	32.15	4.71	5.60	37.20	45.66	18.26	10.07
4	7.00	8.50	1.50	Granular	8.04	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	38.18	44.21	4.71	8.19	49.74	66.40	26.56	14.01
5	8.50	10.00	1.50	Granular	8.04	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	50.24	56.28	4.71	10.78	62.29	89.73	35.89	18.68
6	10.00	11.50	1.50	Granular	8.04	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	62.31	68.34	4.71	13.37	74.83	115.65	46.26	24.07
7	11.50	13.00	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	75.24	82.13	4.71	16.77	105.37	162.95	65.18	30.42
8	13.00	14.50	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	89.03	95.92	4.71	19.84	122.22	199.64	79.86	37.62
9	14.50	16.00	1.50	Granular	9.69	0.05	27	-	13.80	15.50	1.00	-	15.25	16.00	95.92	95.92	4.71	21.38	122.49	221.29	88.52	45.26
10	16.00	17.50	1.50	Granular	9.69	0.05	27	-	13.80	15.50	1.00	-	16.75	17.50	95.92	95.92	4.71	21.38	122.49	242.67	97.07	52.89
11	17.50	19.00	1.50	Granular	9.69	0.08	25	-	10.00	10.88	1.00	-	18.25	19.00	95.92	95.92	4.71	19.79	86.08	226.05	90.42	60.08
12	19.00	20.50	1.50	Granular	9.69	0.08	25	-	10.00	10.88	1.00	-	19.75	20.50	95.92	95.92	4.71	19.79	86.08	245.84	98.34	67.27
13	20.50	22.00	1.50	Granular	9.69	0.07	26	-	11.90	13.19	1.00	-	21.25	22.00	95.92	95.92	4.71	20.59	104.29	284.63	113.85	74.69
14	22.00	23.50	1.50	Granular	9.69	0.07	26	-	11.90	13.19	1.00	-	22.75	23.50	95.92	95.92	4.71	20.59	104.29	305.22	122.09	82.10
15	23.50	25.00	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	24.25	25.00	95.92	95.92	4.71	21.38	122.49	344.80	137.92	89.74
16	25.00	26.50	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	25.75	26.50	95.92	95.92	4.71	21.38	122.49	366.18	146.47	97.37
17	26.50	28.00	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	27.25	28.00	95.92	95.92	4.71	22.96	158.90	425.55	170.22	105.45
18	28.00	29.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	28.75	29.50	95.92	95.92	4.71	22.96	158.90	448.51	179.41	113.53
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	95.92	95.92	1.57	7.92	177.11	474.64	189.85	116.29

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.29E+03	3.63	1.10	2.00	1.83	7.28	6.65	0.221	0.883	9.06	2.26	32.98	15.06	21.73	5.43	79.15	36.14
2	22.50	16	2.96E+07	4.91E-02	2.32E+03	3.62	1.10	2.00	1.83	7.26	6.63	0.219	0.875	9.14	2.29	33.18	15.15	21.94	5.48	79.64	36.37
3	24.00	17	2.96E+07	4.91E-02	2.36E+03	3.61	1.11	2.00	1.83	7.24	6.61	0.217	0.867	9.23	2.31	33.40	15.26	22.16	5.54	80.17	36.62
4	25.50	17	2.96E+07	4.91E-02	2.40E+03	3.60	1.11	2.00	1.83	7.21	6.59	0.214	0.857	9.33	2.33	33.65	15.37	22.40	5.60	80.75	36.89
5	27.00	17	2.96E+07	4.91E-02	2.43E+03	3.59	1.11	2.00	1.83	7.19	6.57	0.212	0.849	9.42	2.36	33.86	15.47	22.61	5.65	81.27	37.13
6	28.50	18	2.96E+07	4.91E-02	2.49E+03	3.57	1.12	2.00	1.83	7.15	6.54	0.209	0.837	9.56	2.39	34.19	15.62	22.94	5.73	82.05	37.49
7	30.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.51	0.206	0.824	9.70	2.43	34.53	15.78	23.29	5.82	82.88	37.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-18	-
Chainage	2+567	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.00	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-18	1.20	22.00	19.50	18.00	176.44	103.74	11.79	2.95
BH-18	1.20	23.50	21.00	19.50	189.32	115.13	11.90	2.98
BH-18	1.20	25.00	22.50	21.00	216.32	126.86	12.02	3.01
BH-18	1.20	26.50	24.00	22.50	229.69	138.60	12.15	3.04
BH-18	1.20	28.00	25.50	24.00	271.30	151.03	12.27	3.07
BH-18	1.20	29.50	27.00	25.50	285.66	163.45	12.44	3.11
BH-18	1.20	30.00	27.50	26.00	304.23	167.71	12.63	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.69	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	15.06	20.08	5.65	3.43	22.53	25.96	10.38	9.67
3	5.50	7.00	1.50	Granular	8.04	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	26.11	32.15	5.65	6.72	54.65	64.81	25.92	13.93
4	7.00	8.50	1.50	Granular	8.04	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	38.18	44.21	5.65	9.83	72.72	92.70	37.08	19.06
5	8.50	10.00	1.50	Granular	8.04	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	50.24	56.28	5.65	12.94	90.78	123.71	49.48	25.05
6	10.00	11.50	1.50	Granular	8.04	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	62.31	68.34	5.65	16.05	108.85	157.82	63.13	31.92
7	11.50	13.00	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	12.25	13.00	75.24	82.13	5.65	20.12	153.17	222.26	88.91	39.93
8	13.00	14.50	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	13.75	14.50	89.03	95.92	5.65	23.81	177.44	270.34	108.14	48.97
9	14.50	16.00	1.50	Granular	9.69	0.05	27	-	13.80	15.50	1.00	-	15.25	16.00	103.19	110.46	5.65	27.60	203.49	323.99	129.60	59.07
10	16.00	17.50	1.50	Granular	9.69	0.05	27	-	13.80	15.50	1.00	-	16.75	17.50	117.73	125.00	5.65	31.49	229.08	381.07	152.43	70.26
11	17.50	19.00	1.50	Granular	9.69	0.08	25	-	10.00	10.88	1.00	-	18.25	19.00	125.00	125.00	5.65	30.95	160.97	343.91	137.56	81.31
12	19.00	20.50	1.50	Granular	9.69	0.08	25	-	10.00	10.88	1.00	-	19.75	20.50	125.00	125.00	5.65	30.95	160.97	374.86	149.94	92.35
13	20.50	22.00	1.50	Granular	9.69	0.07	26	-	11.90	13.19	1.00	-	21.25	22.00	125.00	125.00	5.65	32.19	195.02	441.11	176.44	103.74
14	22.00	23.50	1.50	Granular	9.69	0.07	26	-	11.90	13.19	1.00	-	22.75	23.50	125.00	125.00	5.65	32.19	195.02	473.30	189.32	115.13
15	23.50	25.00	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	24.25	25.00	125.00	125.00	5.65	33.43	229.08	540.79	216.32	126.86
16	25.00	26.50	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	25.75	26.50	125.00	125.00	5.65	33.43	229.08	574.22	229.69	138.60
17	26.50	28.00	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	27.25	28.00	125.00	125.00	5.65	35.91	297.20	678.24	271.30	151.03
18	28.00	29.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	28.75	29.50	125.00	125.00	5.65	35.91	297.20	714.14	285.66	163.45
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	125.00	125.00	1.88	12.38	331.25	760.58	304.23	167.71

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.29E+03	4.21	0.95	2.02	1.84	8.51	7.72	0.170	0.678	11.79	2.95	50.15	22.76	28.30	7.08	120.35	54.62
2	22.50	16	2.96E+07	1.02E-01	2.32E+03	4.19	0.95	2.02	1.84	8.48	7.70	0.168	0.672	11.90	2.98	50.46	22.90	28.56	7.14	121.10	54.97
3	24.00	17	2.96E+07	1.02E-01	2.36E+03	4.18	0.96	2.02	1.84	8.45	7.67	0.166	0.666	12.02	3.01	50.79	23.06	28.85	7.21	121.90	55.34
4	25.50	17	2.96E+07	1.02E-01	2.40E+03	4.17	0.96	2.02	1.84	8.42	7.65	0.165	0.658	12.15	3.04	51.16	23.23	29.16	7.29	122.78	55.75
5	27.00	17	2.96E+07	1.02E-01	2.43E+03	4.15	0.96	2.02	1.84	8.39	7.62	0.163	0.652	12.27	3.07	51.49	23.38	29.44	7.36	123.57	56.11
6	28.50	18	2.96E+07	1.02E-01	2.49E+03	4.14	0.97	2.02	1.84	8.35	7.59	0.161	0.643	12.44	3.11	51.98	23.61	29.87	7.47	124.75	56.66
7	30.00	18	2.96E+07	1.02E-01	2.55E+03	4.12	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.63	3.16	52.50	23.85	30.32	7.58	126.00	57.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-18A	-
Chainage	2+279	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	105.82	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-18A	1.00	22.00	19.50	16.50	161.31	82.50	11.27	2.82
BH-18A	1.00	23.50	21.00	18.00	171.79	91.49	11.53	2.88
BH-18A	1.00	25.00	22.50	19.50	182.27	100.48	11.85	2.96
BH-18A	1.00	26.50	24.00	21.00	192.75	109.46	12.12	3.03
BH-18A	1.00	28.00	25.50	22.50	203.24	118.45	12.35	3.09
BH-18A	1.00	29.50	27.00	24.00	213.72	127.44	12.54	3.13
BH-18A	1.00	30.00	27.50	24.50	217.21	130.43	12.69	3.17

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.96	11.92	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	17.87	23.83	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.79	35.75	4.71	6.39	40.89	47.29	18.91	9.49
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	41.70	47.66	4.71	8.95	53.28	68.63	27.45	13.64
5	8.50	10.00	1.50	Granular	9.69	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	54.93	62.20	4.71	11.79	69.22	96.35	38.54	18.59
6	10.00	11.50	1.50	Granular	9.69	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	69.47	76.74	4.71	14.91	84.34	126.38	50.55	24.42
7	11.50	13.00	1.50	Granular	9.69	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	84.01	91.28	4.71	19.42	134.18	195.64	78.26	31.50
8	13.00	14.50	1.50	Granular	9.69	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	98.55	105.82	4.71	22.78	154.60	238.84	95.53	39.53
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	105.82	105.82	4.71	25.33	174.61	284.18	113.67	48.27
10	16.00	17.50	1.50	Granular	9.09	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	105.82	105.82	4.71	25.33	174.20	309.09	123.64	57.01
11	17.50	19.00	1.50	Granular	9.09	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	105.82	105.82	4.71	23.58	134.26	292.74	117.10	65.27
12	19.00	20.50	1.50	Granular	10.19	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	105.82	105.82	4.71	23.58	134.86	316.93	126.77	73.52
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	105.82	105.82	4.71	26.20	195.01	403.27	161.31	82.50
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	105.82	105.82	4.71	26.20	195.01	429.48	171.79	91.49
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	105.82	105.82	4.71	26.20	195.01	455.68	182.27	100.48
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	105.82	105.82	4.71	26.20	195.01	481.88	192.75	109.46
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	105.82	105.82	4.71	26.20	195.01	508.09	203.24	118.45
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	105.82	105.82	4.71	26.20	195.01	534.29	213.72	127.44
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	105.82	105.82	1.57	8.73	195.01	543.03	217.21	130.43

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.91E+03	3.46	1.59	1.95	1.81	6.77	6.29	0.178	0.710	11.27	2.82	38.15	17.70	27.04	6.76	91.55	42.49
2	22.50	21	2.96E+07	4.91E-02	3.01E+03	3.44	1.60	1.95	1.81	6.72	6.24	0.174	0.694	11.53	2.88	38.73	17.98	27.66	6.92	92.96	43.16
3	24.00	22	2.96E+07	4.91E-02	3.15E+03	3.41	1.61	1.95	1.81	6.66	6.19	0.169	0.675	11.85	2.96	39.45	18.32	28.43	7.11	94.68	43.97
4	25.50	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.660	12.12	3.03	40.05	18.61	29.09	7.27	96.13	44.66
5	27.00	24	2.96E+07	4.91E-02	3.35E+03	3.37	1.63	1.95	1.81	6.57	6.10	0.162	0.648	12.35	3.09	40.55	18.84	29.63	7.41	97.31	45.22
6	28.50	24	2.96E+07	4.91E-02	3.44E+03	3.35	1.64	1.95	1.81	6.53	6.07	0.160	0.638	12.54	3.13	40.96	19.04	30.09	7.52	98.32	45.69
7	30.00	25	2.96E+07	4.91E-02	3.50E+03	3.34	1.65	1.95	1.81	6.51	6.05	0.158	0.630	12.69	3.17	41.30	19.20	30.46	7.61	99.12	46.08

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-18A	-
Chainage	2+279	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	163.42	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Grip Length	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-18A	1.20	22.00	19.50	16.50	303.65	127.05	14.63	3.66
BH-18A	1.20	23.50	21.00	18.00	323.07	143.02	14.97	3.74
BH-18A	1.20	25.00	22.50	19.50	342.50	158.99	15.39	3.85
BH-18A	1.20	26.50	24.00	21.00	361.92	174.97	15.75	3.94
BH-18A	1.20	28.00	25.50	22.50	381.34	190.94	16.04	4.01
BH-18A	1.20	29.50	27.00	24.00	400.77	206.91	16.29	4.07
BH-18A	1.20	30.00	27.50	24.50	407.24	212.23	16.49	4.12

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.01	22	-	4.00	7.59	0.60	-	3.25	4.00	13.31	26.63	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.75	0.01	22	-	4.00	7.59	0.60	-	4.75	5.50	39.94	53.25	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	0.80	-	6.25	7.00	59.21	65.17	5.65	12.20	104.01	116.21	46.48	14.50
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	0.80	-	7.75	8.50	71.12	77.08	5.65	14.65	121.85	148.70	59.48	20.98
5	8.50	10.00	1.50	Granular	9.69	0.03	26	-	11.90	13.19	0.80	-	9.25	10.00	84.35	91.62	5.65	17.38	145.04	189.27	75.71	28.22
6	10.00	11.50	1.50	Granular	9.69	0.03	26	-	11.90	13.19	0.80	-	10.75	11.50	98.89	106.16	5.65	20.37	166.81	231.42	92.57	36.30
7	11.50	13.00	1.50	Granular	9.69	0.00	28	-	15.70	17.82	0.90	-	12.25	13.00	113.43	120.70	5.65	28.31	254.44	347.36	138.94	46.60
8	13.00	14.50	1.50	Granular	9.69	0.00	28	-	15.70	17.82	0.90	-	13.75	14.50	127.97	135.24	5.65	31.94	283.85	408.71	163.48	57.92
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	0.95	-	15.25	16.00	142.51	149.78	5.65	38.89	353.81	517.56	207.02	71.18
10	16.00	17.50	1.50	Granular	9.09	0.02	29	-	17.60	20.13	0.95	-	16.75	17.50	156.60	163.42	5.65	42.73	384.25	590.73	236.29	85.52
11	17.50	19.00	1.50	Granular	9.09	0.10	27	-	13.80	15.50	0.85	-	18.25	19.00	163.42	163.42	5.65	37.15	296.13	539.76	215.90	98.30
12	19.00	20.50	1.50	Granular	10.19	0.10	27	-	13.80	15.50	0.85	-	19.75	20.50	163.42	163.42	5.65	37.15	297.16	577.94	231.18	111.08
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	163.42	163.42	5.65	48.56	429.77	759.12	303.65	127.05
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	163.42	163.42	5.65	48.56	429.77	807.68	323.07	143.02
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	163.42	163.42	5.65	48.56	429.77	856.24	342.50	158.99
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	163.42	163.42	5.65	48.56	429.77	904.80	361.92	174.97
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	163.42	163.42	5.65	48.56	429.77	953.36	381.34	190.94
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	163.42	163.42	5.65	48.56	429.77	1001.92	400.77	206.91
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	163.42	163.42	1.88	16.19	429.77	1018.11	407.24	212.23

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.91E+03	4.01	1.37	1.97	1.82	7.91	7.30	0.137	0.547	14.63	3.66	57.91	26.70	35.12	8.78	138.99	64.09
2	22.50	21	2.96E+07	1.02E-01	3.01E+03	3.98	1.38	1.97	1.82	7.85	7.25	0.134	0.534	14.97	3.74	58.80	27.12	35.94	8.98	141.13	65.09
3	24.00	22	2.96E+07	1.02E-01	3.15E+03	3.95	1.39	1.97	1.82	7.78	7.18	0.130	0.520	15.39	3.85	59.89	27.63	36.94	9.23	143.74	66.32
4	25.50	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.508	15.75	3.94	60.81	28.07	37.79	9.45	145.94	67.36
5	27.00	24	2.96E+07	1.02E-01	3.35E+03	3.90	1.41	1.97	1.82	7.68	7.09	0.125	0.499	16.04	4.01	61.56	28.42	38.49	9.62	147.74	68.21
6	28.50	24	2.96E+07	1.02E-01	3.44E+03	3.88	1.42	1.97	1.82	7.64	7.05	0.123	0.491	16.29	4.07	62.19	28.72	39.09	9.77	149.27	68.93
7	30.00	25	2.96E+07	1.02E-01	3.50E+03	3.86	1.42	1.97	1.82	7.61	7.03	0.121	0.485	16.49	4.12	62.70	28.96	39.57	9.89	150.48	69.50

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-19	-
Chainage	2+591	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	92.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-19	1.00	22.00	19.50	16.50	124.51	73.13	8.96	2.24
BH-19	1.00	23.50	21.00	18.00	133.08	80.78	9.12	2.28
BH-19	1.00	25.00	22.50	19.50	156.39	88.86	9.28	2.32
BH-19	1.00	26.50	24.00	21.00	165.57	96.93	9.45	2.36
BH-19	1.00	28.00	25.50	22.50	174.75	105.01	9.62	2.41
BH-19	1.00	29.50	27.00	24.00	183.93	113.09	9.78	2.45
BH-19	1.00	30.00	27.50	24.50	186.99	115.78	9.93	2.48

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.69	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	6.25	7.00	26.04	32.00	4.71	4.73	20.38	25.11	10.04	9.02
4	7.00	8.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	7.75	8.50	37.95	43.91	4.71	6.89	27.51	39.13	15.65	12.60
5	8.50	10.00	1.50	Granular	7.94	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	49.87	55.83	4.71	10.29	51.01	72.92	29.17	17.13
6	10.00	11.50	1.50	Granular	8.19	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	61.97	68.12	4.71	12.79	61.64	96.34	38.54	22.36
7	11.50	13.00	1.50	Granular	8.19	0.02	26	-	11.90	13.19	1.00	-	12.25	13.00	74.26	80.41	4.71	15.94	87.45	138.09	55.23	28.47
8	13.00	14.50	1.50	Granular	8.19	0.02	26	-	11.90	13.19	1.00	-	13.75	14.50	86.55	92.70	4.71	18.57	100.23	169.44	67.78	35.32
9	14.50	16.00	1.50	Granular	8.19	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	92.70	92.70	4.71	21.42	135.24	225.88	90.35	42.97
10	16.00	17.50	1.50	Granular	9.09	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	92.70	92.70	4.71	21.42	135.80	247.86	99.14	50.62
11	17.50	19.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	92.70	92.70	4.71	20.66	118.23	250.94	100.38	58.05
12	19.00	20.50	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	92.70	92.70	4.71	20.66	118.23	271.60	108.64	65.49
13	20.50	22.00	1.50	Granular	10.19	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	92.70	92.70	4.71	21.42	136.48	311.28	124.51	73.13
14	22.00	23.50	1.50	Granular	10.19	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	92.70	92.70	4.71	21.42	136.48	332.70	133.08	80.78
15	23.50	25.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	92.70	92.70	4.71	22.95	171.79	390.97	156.39	88.86
16	25.00	26.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	92.70	92.70	4.71	22.95	171.79	413.92	165.57	96.93
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	92.70	92.70	4.71	22.95	171.79	436.88	174.75	105.01
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	92.70	92.70	4.71	22.95	171.79	459.83	183.93	113.09
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	92.70	92.70	1.57	7.65	171.79	467.48	186.99	115.78

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	14	2.96E+07	4.91E-02	2.03E+03	3.72	1.48	1.96	1.82	7.31	6.76	0.223	0.893	8.96	2.24	32.74	15.15	21.50	5.37	78.57	36.35
2	22.50	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.49	1.96	1.82	7.27	6.72	0.219	0.877	9.12	2.28	33.14	15.34	21.89	5.47	79.54	36.80
3	24.00	15	2.96E+07	4.91E-02	2.15E+03	3.68	1.49	1.96	1.82	7.22	6.69	0.216	0.862	9.28	2.32	33.52	15.51	22.27	5.57	80.44	37.23
4	25.50	16	2.96E+07	4.91E-02	2.21E+03	3.66	1.50	1.96	1.82	7.18	6.65	0.212	0.846	9.45	2.36	33.94	15.71	22.69	5.67	81.45	37.71
5	27.00	16	2.96E+07	4.91E-02	2.27E+03	3.64	1.51	1.96	1.82	7.14	6.61	0.208	0.831	9.62	2.41	34.34	15.90	23.09	5.77	82.42	38.16
6	28.50	16	2.96E+07	4.91E-02	2.33E+03	3.62	1.52	1.96	1.82	7.10	6.58	0.204	0.818	9.78	2.45	34.72	16.08	23.48	5.87	83.32	38.59
7	30.00	17	2.96E+07	4.91E-02	2.39E+03	3.60	1.53	1.96	1.82	7.06	6.54	0.201	0.806	9.93	2.48	35.07	16.25	23.83	5.96	84.16	38.99

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-19	-
Chainage	2+591	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	118.63	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-19	1.20	22.00	19.50	16.50	195.44	101.42	11.64	2.91
BH-19	1.20	23.50	21.00	18.00	208.60	113.01	11.85	2.96
BH-19	1.20	25.00	22.50	19.50	248.66	125.26	12.05	3.01
BH-19	1.20	26.50	24.00	21.00	262.76	137.50	12.28	3.07
BH-19	1.20	28.00	25.50	22.50	276.86	149.75	12.50	3.13
BH-19	1.20	29.50	27.00	24.00	290.96	161.99	12.71	3.18
BH-19	1.20	30.00	27.50	24.50	295.66	166.07	12.90	3.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.69	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	6.25	7.00	26.04	32.00	5.65	5.67	29.71	35.39	14.15	12.67
4	7.00	8.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	7.75	8.50	37.95	43.91	5.65	8.27	39.97	53.92	21.57	17.36
5	8.50	10.00	1.50	Granular	7.94	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	49.87	55.83	5.65	12.35	74.35	100.64	40.26	23.20
6	10.00	11.50	1.50	Granular	8.19	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	61.97	68.12	5.65	15.35	89.70	131.34	52.53	29.87
7	11.50	13.00	1.50	Granular	8.19	0.02	26	-	11.90	13.19	1.00	-	12.25	13.00	74.26	80.41	5.65	19.12	127.03	187.80	75.12	37.60
8	13.00	14.50	1.50	Granular	8.19	0.02	26	-	11.90	13.19	1.00	-	13.75	14.50	86.55	92.70	5.65	22.29	145.44	228.49	91.40	46.21
9	14.50	16.00	1.50	Granular	8.19	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	98.84	104.99	5.65	27.41	221.06	331.53	132.61	56.26
10	16.00	17.50	1.50	Granular	9.09	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	111.81	118.63	5.65	31.01	249.61	391.08	156.43	67.32
11	17.50	19.00	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	118.63	118.63	5.65	31.72	217.30	390.50	156.20	78.58
12	19.00	20.50	1.50	Granular	9.09	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	118.63	118.63	5.65	31.72	217.30	422.22	168.89	89.84
13	20.50	22.00	1.50	Granular	10.19	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	118.63	118.63	5.65	32.90	250.78	488.61	195.44	101.42
14	22.00	23.50	1.50	Granular	10.19	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	118.63	118.63	5.65	32.90	250.78	521.51	208.60	113.01
15	23.50	25.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	118.63	118.63	5.65	35.25	315.68	621.65	248.66	125.26
16	25.00	26.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	118.63	118.63	5.65	35.25	315.68	656.90	262.76	137.50
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	118.63	118.63	5.65	35.25	315.68	692.15	276.86	149.75
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	118.63	118.63	5.65	35.25	315.68	727.40	290.96	161.99
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	118.63	118.63	1.88	11.75	315.68	739.15	295.66	166.07

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	14	2.96E+07	1.02E-01	2.03E+03	4.31	1.28	1.98	1.82	8.54	7.85	0.172	0.687	11.64	2.91	49.71	22.85	27.93	6.98	119.30	54.83
2	22.50	15	2.96E+07	1.02E-01	2.09E+03	4.28	1.28	1.98	1.82	8.49	7.81	0.169	0.675	11.85	2.96	50.32	23.13	28.44	7.11	120.76	55.52
3	24.00	15	2.96E+07	1.02E-01	2.15E+03	4.26	1.29	1.98	1.82	8.44	7.77	0.166	0.664	12.05	3.01	50.89	23.40	28.93	7.23	122.13	56.16
4	25.50	16	2.96E+07	1.02E-01	2.21E+03	4.23	1.30	1.98	1.82	8.39	7.72	0.163	0.651	12.28	3.07	51.53	23.70	29.48	7.37	123.67	56.88
5	27.00	16	2.96E+07	1.02E-01	2.27E+03	4.21	1.31	1.98	1.82	8.34	7.68	0.160	0.640	12.50	3.13	52.14	23.99	30.00	7.50	125.13	57.57
6	28.50	16	2.96E+07	1.02E-01	2.33E+03	4.19	1.31	1.98	1.82	8.30	7.64	0.157	0.630	12.71	3.18	52.71	24.26	30.50	7.62	126.51	58.21
7	30.00	17	2.96E+07	1.02E-01	2.39E+03	4.17	1.32	1.98	1.82	8.25	7.60	0.155	0.620	12.90	3.22	53.24	24.51	30.96	7.74	127.78	58.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-19A	-
Chainage	2+420	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	105.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-19A	1.00	22.00	19.50	19.50	147.90	84.77	10.47	2.62
BH-19A	1.00	23.50	21.00	21.00	157.63	93.23	10.62	2.65
BH-19A	1.00	25.00	22.50	22.50	183.94	102.18	10.77	2.69
BH-19A	1.00	26.50	24.00	24.00	194.70	111.12	10.92	2.73
BH-19A	1.00	28.00	25.50	25.50	205.12	120.07	11.09	2.77
BH-19A	1.00	29.50	27.00	27.00	215.54	129.01	11.24	2.81
BH-19A	1.00	30.00	27.50	27.50	219.02	131.99	11.36	2.84

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	4.71	1.11	12.09	13.20	5.28	4.71
2	4.00	5.50	1.50	Granular	7.19	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	16.19	21.58	4.71	3.34	21.34	25.80	10.32	7.29
3	5.50	7.00	1.50	Granular	9.29	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	28.55	35.52	4.71	5.89	34.12	44.47	17.79	10.59
4	7.00	8.50	1.50	Granular	9.29	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	42.49	49.46	4.71	8.77	46.08	65.19	26.08	14.70
5	8.50	10.00	1.50	Granular	9.29	0.05	27	-	13.80	15.50	1.00	-	9.25	10.00	56.43	63.40	4.71	12.58	82.53	114.22	45.69	19.87
6	10.00	11.50	1.50	Granular	9.29	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	70.37	77.34	4.71	15.68	99.57	146.94	58.78	25.91
7	11.50	13.00	1.50	Granular	9.29	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	84.31	91.28	4.71	19.49	133.94	200.79	80.32	33.01
8	13.00	14.50	1.50	Granular	9.29	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	98.25	105.22	4.71	22.71	153.51	243.08	97.23	41.02
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	105.22	105.22	4.71	25.19	174.01	288.76	115.50	49.72
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	105.22	105.22	4.71	25.19	174.01	313.95	125.58	58.43
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	105.22	105.22	4.71	26.06	193.94	359.94	143.98	67.37
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	105.22	105.22	4.71	26.06	193.94	386.00	154.40	76.32
13	20.50	22.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	105.22	105.22	4.71	24.32	153.39	369.76	147.90	84.77
14	22.00	23.50	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	105.22	105.22	4.71	24.32	153.39	394.08	157.63	93.23
15	23.50	25.00	1.50	Granular	9.09	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	105.22	105.22	4.71	26.06	193.10	459.84	183.94	102.18
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	105.22	105.22	4.71	26.06	193.94	486.74	194.70	111.12
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	105.22	105.22	4.71	26.06	193.94	512.80	205.12	120.07
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	105.22	105.22	4.71	26.06	193.94	538.85	215.54	129.01
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	105.22	105.22	1.57	8.69	193.94	547.54	219.02	131.99

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.28E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.764	10.47	2.62	36.32	16.33	25.12	6.28	87.18	39.19
2	22.50	24	2.96E+07	4.91E-02	3.35E+03	3.37	0.74	2.05	1.84	6.91	6.21	0.188	0.754	10.62	2.65	36.66	16.48	25.48	6.37	87.99	39.56
3	24.00	24	2.96E+07	4.91E-02	3.43E+03	3.35	0.75	2.05	1.84	6.87	6.18	0.186	0.743	10.77	2.69	37.01	16.64	25.84	6.46	88.83	39.95
4	25.50	25	2.96E+07	4.91E-02	3.51E+03	3.34	0.75	2.05	1.84	6.84	6.15	0.183	0.732	10.92	2.73	37.37	16.81	26.22	6.55	89.69	40.34
5	27.00	25	2.96E+07	4.91E-02	3.60E+03	3.32	0.75	2.05	1.84	6.81	6.12	0.180	0.721	11.09	2.77	37.76	16.98	26.63	6.66	90.62	40.76
6	28.50	26	2.96E+07	4.91E-02	3.67E+03	3.31	0.76	2.05	1.84	6.78	6.10	0.178	0.712	11.24	2.81	38.09	17.13	26.97	6.74	91.40	41.12
7	30.00	26	2.96E+07	4.91E-02	3.73E+03	3.30	0.76	2.05	1.84	6.75	6.08	0.176	0.705	11.36	2.84	38.35	17.26	27.25	6.81	92.04	41.41

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-19A	-
Chainage	2+420	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	135.80	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-19A	1.20	22.00	19.50	19.50	231.77	117.46	13.70	3.43
BH-19A	1.20	23.50	21.00	21.00	246.83	130.38	13.90	3.47
BH-19A	1.20	25.00	22.50	22.50	292.43	144.05	14.09	3.52
BH-19A	1.20	26.50	24.00	24.00	309.15	157.73	14.30	3.57
BH-19A	1.20	28.00	25.50	25.50	325.29	171.40	14.52	3.63
BH-19A	1.20	29.50	27.00	27.00	341.43	185.07	14.71	3.68
BH-19A	1.20	30.00	27.50	27.50	346.81	189.63	14.86	3.71

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	5.65	1.34	18.22	19.56	7.82	6.71
2	4.00	5.50	1.50	Granular	7.19	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	16.19	21.58	5.65	4.01	31.55	36.89	14.76	10.20
3	5.50	7.00	1.50	Granular	9.29	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	28.55	35.52	5.65	7.07	50.19	62.61	25.04	14.56
4	7.00	8.50	1.50	Granular	9.29	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	42.49	49.46	5.65	10.52	67.41	90.34	36.14	19.88
5	8.50	10.00	1.50	Granular	9.29	0.05	27	-	13.80	15.50	1.00	-	9.25	10.00	56.43	63.40	5.65	15.09	120.30	158.33	63.33	26.48
6	10.00	11.50	1.50	Granular	9.29	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	70.37	77.34	5.65	18.82	144.84	201.68	80.67	34.13
7	11.50	13.00	1.50	Granular	9.29	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	84.31	91.28	5.65	23.38	194.52	274.75	109.90	43.05
8	13.00	14.50	1.50	Granular	9.29	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	98.25	105.22	5.65	27.25	222.71	330.19	132.08	53.05
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	112.87	120.51	5.65	32.42	287.54	427.44	170.97	64.51
10	16.00	17.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	128.16	135.80	5.65	36.81	322.47	499.18	199.67	77.19
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	135.80	135.80	5.65	40.35	359.43	576.49	230.60	90.86
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	135.80	135.80	5.65	40.35	359.43	616.84	246.74	104.54
13	20.50	22.00	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	135.80	135.80	5.65	37.66	284.34	579.42	231.77	117.46
14	22.00	23.50	1.50	Granular	9.09	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	135.80	135.80	5.65	37.66	284.34	617.08	246.83	130.38
15	23.50	25.00	1.50	Granular	9.09	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	135.80	135.80	5.65	40.35	357.96	731.06	292.43	144.05
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	135.80	135.80	5.65	40.35	359.43	772.88	309.15	157.73
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	135.80	135.80	5.65	40.35	359.43	813.23	325.29	171.40
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	135.80	135.80	5.65	40.35	359.43	853.59	341.43	185.07
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	135.80	135.80	1.88	13.45	359.43	867.04	346.81	189.63

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.28E+03	3.91	0.64	2.07	1.85	8.09	7.24	0.146	0.584	13.70	3.43	55.43	24.80	32.89	8.22	133.03	59.51
2	22.50	24	2.96E+07	1.02E-01	3.35E+03	3.90	0.64	2.07	1.85	8.05	7.21	0.144	0.576	13.90	3.47	55.95	25.03	33.35	8.34	134.27	60.07
3	24.00	24	2.96E+07	1.02E-01	3.43E+03	3.88	0.64	2.07	1.85	8.01	7.17	0.142	0.568	14.09	3.52	56.48	25.27	33.83	8.46	135.55	60.65
4	25.50	25	2.96E+07	1.02E-01	3.51E+03	3.86	0.65	2.07	1.85	7.98	7.14	0.140	0.560	14.30	3.57	57.02	25.52	34.32	8.58	136.85	61.25
5	27.00	25	2.96E+07	1.02E-01	3.60E+03	3.84	0.65	2.07	1.85	7.94	7.10	0.138	0.551	14.52	3.63	57.61	25.79	34.85	8.71	138.26	61.88
6	28.50	26	2.96E+07	1.02E-01	3.67E+03	3.83	0.65	2.06	1.85	7.90	7.07	0.136	0.544	14.71	3.68	58.11	26.01	35.30	8.82	139.45	62.43
7	30.00	26	2.96E+07	1.02E-01	3.73E+03	3.81	0.66	2.06	1.85	7.87	7.05	0.135	0.538	14.86	3.71	58.50	26.19	35.66	8.92	140.41	62.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-20	-
Chainage	2+541	km
Bottom Depth of pile	27.50	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	96.07	kN/m^2
Pile shaft Length Below cut-off	25.00	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-20	1.00	22.00	19.50	18.00	122.05	75.37	8.54	2.13
BH-20	1.00	23.50	21.00	19.50	130.85	83.01	8.54	2.13
BH-20	1.00	25.00	22.50	21.00	154.67	91.10	8.54	2.13
BH-20	1.00	26.50	24.00	22.50	163.87	99.19	8.54	2.13
BH-20	1.00	27.50	25.00	23.50	177.52	104.73	8.54	2.13
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.96	11.92	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	17.87	23.83	4.71	3.25	15.50	18.75	7.50	6.96
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.79	35.75	4.71	6.39	40.89	50.53	20.21	10.40
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	41.70	47.66	4.71	8.95	53.28	71.87	28.75	14.55
5	8.50	10.00	1.50	Granular	7.94	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	53.62	59.58	4.71	11.51	65.67	95.77	38.31	19.42
6	10.00	11.50	1.50	Granular	8.19	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	65.72	71.87	4.71	14.10	78.57	122.77	49.11	25.02
7	11.50	13.00	1.50	Granular	8.19	0.08	25	-	10.00	10.88	1.00	-	12.25	13.00	78.01	84.16	4.71	16.10	75.40	135.70	54.28	31.18
8	13.00	14.50	1.50	Granular	7.94	0.08	25	-	10.00	10.88	1.00	-	13.75	14.50	90.11	96.07	4.71	18.60	85.52	164.41	65.76	38.03
9	14.50	16.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	15.25	16.00	96.07	96.07	4.71	20.62	103.62	203.13	81.25	45.46
10	16.00	17.50	1.50	Granular	9.09	0.03	26	-	11.90	13.19	1.00	-	16.75	17.50	96.07	96.07	4.71	20.62	104.16	224.29	89.72	52.88
11	17.50	19.00	1.50	Granular	9.09	0.08	26	-	11.90	13.19	1.00	-	18.25	19.00	96.07	96.07	4.71	20.62	104.16	244.91	97.96	60.30
12	19.00	20.50	1.50	Granular	9.09	0.08	26	-	11.90	13.19	1.00	-	19.75	20.50	96.07	96.07	4.71	20.62	104.16	265.52	106.21	67.72
13	20.50	22.00	1.50	Granular	9.09	0.07	27	-	13.80	15.50	1.00	-	21.25	22.00	96.07	96.07	4.71	21.41	122.35	305.12	122.05	75.37
14	22.00	23.50	1.50	Granular	10.19	0.07	27	-	13.80	15.50	1.00	-	22.75	23.50	96.07	96.07	4.71	21.41	122.95	327.13	130.85	83.01
15	23.50	25.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	24.25	25.00	96.07	96.07	4.71	23.00	159.49	386.67	154.67	91.10
16	25.00	26.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	25.75	26.50	96.07	96.07	4.71	23.00	159.49	409.67	163.87	99.19
17	26.50	27.50	1.00	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.00	27.50	96.07	96.07	3.14	15.86	177.76	443.80	177.52	104.73

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
2	22.50	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
3	24.00	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
4	25.50	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
5	27.00	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
6	28.50	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72
7	30.00	15	2.96E+07	4.91E-02	2.09E+03	3.70	1.08	2.01	1.83	7.43	6.78	0.234	0.937	8.54	2.13	31.71	14.47	20.49	5.12	76.10	34.72

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-20	-
Chainage	2+541	km
Bottom Depth of pile	27.50	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	121.63	kN/m^2
Pile shaft Length Below cut-off	25.00	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-20	1.20	22.00	19.50	18.00	187.31	103.63	11.12	2.78
BH-20	1.20	23.50	21.00	19.50	200.73	115.11	11.12	2.78
BH-20	1.20	25.00	22.50	21.00	241.29	127.27	11.12	2.78
BH-20	1.20	26.50	24.00	22.50	255.27	139.42	11.12	2.78
BH-20	1.20	27.50	25.00	23.50	278.20	147.75	11.12	2.78
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.96	11.92	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.94	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	17.87	23.83	5.65	3.89	22.68	26.58	10.63	9.80
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.79	35.75	5.65	7.67	59.96	71.53	28.61	14.32
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	41.70	47.66	5.65	10.74	77.80	100.11	40.04	19.70
5	8.50	10.00	1.50	Granular	7.94	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	53.62	59.58	5.65	13.81	95.64	131.76	52.70	25.95
6	10.00	11.50	1.50	Granular	8.19	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	65.72	71.87	5.65	16.93	114.25	167.29	66.91	33.06
7	11.50	13.00	1.50	Granular	8.19	0.08	25	-	10.00	10.88	1.00	-	12.25	13.00	78.01	84.16	5.65	19.32	109.51	181.86	72.74	40.84
8	13.00	14.50	1.50	Granular	7.94	0.08	25	-	10.00	10.88	1.00	-	13.75	14.50	90.11	96.07	5.65	22.31	124.05	218.72	87.49	49.47
9	14.50	16.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	15.25	16.00	102.03	107.99	5.65	26.28	168.13	289.08	115.63	59.20
10	16.00	17.50	1.50	Granular	9.09	0.03	26	-	11.90	13.19	1.00	-	16.75	17.50	114.81	121.63	5.65	29.57	189.49	340.00	136.00	69.85
11	17.50	19.00	1.50	Granular	9.09	0.08	26	-	11.90	13.19	1.00	-	18.25	19.00	121.63	121.63	5.65	31.32	189.49	371.32	148.53	81.00
12	19.00	20.50	1.50	Granular	9.09	0.08	26	-	11.90	13.19	1.00	-	19.75	20.50	121.63	121.63	5.65	31.32	189.49	402.64	161.06	92.14
13	20.50	22.00	1.50	Granular	9.09	0.07	27	-	13.80	15.50	1.00	-	21.25	22.00	121.63	121.63	5.65	32.53	222.58	468.26	187.31	103.63
14	22.00	23.50	1.50	Granular	10.19	0.07	27	-	13.80	15.50	1.00	-	22.75	23.50	121.63	121.63	5.65	32.53	223.61	501.83	200.73	115.11
15	23.50	25.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	24.25	25.00	121.63	121.63	5.65	34.94	290.09	603.23	241.29	127.27
16	25.00	26.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	25.75	26.50	121.63	121.63	5.65	34.94	290.09	638.17	255.27	139.42
17	26.50	27.50	1.00	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.00	27.50	121.63	121.63	3.77	24.09	323.32	695.50	278.20	147.75

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
2	22.50	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
3	24.00	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
4	25.50	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
5	27.00	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
6	28.50	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49
7	30.00	15	2.96E+07	1.02E-01	2.09E+03	4.28	0.93	2.02	1.84	8.67	7.87	0.180	0.720	11.12	2.78	48.22	21.87	26.69	6.67	115.73	52.49

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-20A	-
Chainage	2+514	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-20A	1.00	22.00	19.50	16.50	158.65	81.20	11.45	2.86
BH-20A	1.00	23.50	21.00	18.00	169.02	90.11	11.80	2.95
BH-20A	1.00	25.00	22.50	19.50	179.39	99.02	12.15	3.04
BH-20A	1.00	26.50	24.00	21.00	189.76	107.93	12.15	3.04
BH-20A	1.00	28.00	25.50	22.50	200.13	116.83	12.49	3.12
BH-20A	1.00	29.50	27.00	24.00	210.50	125.74	12.82	3.21
BH-20A	1.00	30.00	27.50	24.50	213.96	128.71	13.16	3.29

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.07	21	-	2.00	6.49	1.00	-	3.25	4.00	5.25	10.49	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.94	0.07	21	-	2.00	6.49	1.00	-	4.75	5.50	16.45	22.41	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	28.36	34.32	4.71	6.09	39.41	45.50	18.20	9.40
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	40.28	46.24	4.71	8.64	51.80	66.53	26.61	13.47
5	8.50	10.00	1.50	Granular	9.29	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	53.21	60.18	4.71	10.98	55.27	80.98	32.39	18.19
6	10.00	11.50	1.50	Granular	9.29	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	67.15	74.12	4.71	13.86	67.22	106.79	42.72	23.72
7	11.50	13.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	81.76	89.41	4.71	18.90	131.86	190.32	76.13	30.66
8	13.00	14.50	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	97.05	104.70	4.71	22.43	153.33	234.22	93.69	38.59
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	104.70	104.70	4.71	25.06	173.17	279.13	111.65	47.26
10	16.00	17.50	1.50	Granular	8.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	104.70	104.70	4.71	25.06	171.79	302.80	121.12	55.93
11	17.50	19.00	1.50	Granular	8.19	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	104.70	104.70	4.71	23.33	132.40	286.75	114.70	64.11
12	19.00	20.50	1.50	Granular	10.19	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	104.70	104.70	4.71	23.33	133.49	311.17	124.47	72.29
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	104.70	104.70	4.71	25.93	193.02	396.62	158.65	81.20
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	104.70	104.70	4.71	25.93	193.02	422.55	169.02	90.11
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	104.70	104.70	4.71	25.93	193.02	448.47	179.39	99.02
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	104.70	104.70	4.71	25.93	193.02	474.40	189.76	107.93
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	104.70	104.70	4.71	25.93	193.02	500.33	200.13	116.83
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	104.70	104.70	4.71	25.93	193.02	526.25	210.50	125.74
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	104.70	104.70	1.57	8.64	193.02	534.89	213.96	128.71

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
6	28.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
7	30.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-20A	-
Chainage	2+514	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.28	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-20A	1.20	22.00	19.50	16.50	250.43	112.01	14.88	3.72
BH-20A	1.20	23.50	21.00	18.00	266.15	125.39	15.33	3.83
BH-20A	1.20	25.00	22.50	19.50	281.88	138.77	15.78	3.95
BH-20A	1.20	26.50	24.00	21.00	297.60	152.15	15.78	3.95
BH-20A	1.20	28.00	25.50	22.50	313.32	165.53	16.23	4.06
BH-20A	1.20	29.50	27.00	24.00	329.04	178.91	16.66	4.17
BH-20A	1.20	30.00	27.50	24.50	334.28	183.37	17.09	4.27

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.07	21	-	2.00	6.49	1.00	-	3.25	4.00	5.25	10.49	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.94	0.07	21	-	2.00	6.49	1.00	-	4.75	5.50	16.45	22.41	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	28.36	34.32	5.65	7.30	57.83	65.13	26.05	13.13
4	7.00	8.50	1.50	Granular	7.94	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	40.28	46.24	5.65	10.37	75.67	93.34	37.34	18.41
5	8.50	10.00	1.50	Granular	9.29	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	53.21	60.18	5.65	13.18	80.64	111.49	44.60	24.47
6	10.00	11.50	1.50	Granular	9.29	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	67.15	74.12	5.65	16.63	97.86	145.34	58.13	31.50
7	11.50	13.00	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	81.76	89.41	5.65	22.68	191.69	261.85	104.74	40.23
8	13.00	14.50	1.50	Granular	10.19	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	97.05	104.70	5.65	26.92	222.61	319.68	127.87	50.14
9	14.50	16.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	112.34	119.99	5.65	32.27	286.34	415.68	166.27	61.55
10	16.00	17.50	1.50	Granular	8.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	126.13	132.28	5.65	36.23	312.02	477.59	191.04	74.07
11	17.50	19.00	1.50	Granular	8.19	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	132.28	132.28	5.65	35.38	240.47	441.42	176.57	86.35
12	19.00	20.50	1.50	Granular	10.19	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	132.28	132.28	5.65	35.38	242.35	478.68	191.47	98.63
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	132.28	132.28	5.65	39.31	350.45	626.08	250.43	112.01
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	132.28	132.28	5.65	39.31	350.45	665.38	266.15	125.39
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	132.28	132.28	5.65	39.31	350.45	704.69	281.88	138.77
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	132.28	132.28	5.65	39.31	350.45	743.99	297.60	152.15
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	132.28	132.28	5.65	39.31	350.45	783.30	313.32	165.53
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	132.28	132.28	5.65	39.31	350.45	822.61	329.04	178.91
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	132.28	132.28	1.88	13.10	350.45	835.71	334.28	183.37

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
6	28.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
7	30.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22

A.4. Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-21	1.00	22.00	19.50	16.50	322.22	140.44	10.73	2.68	148.04	76.80	10.73	2.68
BH-21	1.00	23.50	21.00	18.00	343.67	157.11	11.10	2.77	157.84	85.31	11.10	2.77
BH-21	1.00	25.00	22.50	19.50	365.13	173.78	11.45	2.86	167.64	93.82	11.45	2.86
BH-21	1.00	26.50	24.00	21.00	386.82	190.45	11.80	2.95	177.67	102.33	11.80	2.95
BH-21	1.00	28.00	25.50	22.50	408.28	207.11	12.15	3.04	187.47	110.83	12.15	3.04
BH-21	1.00	29.50	27.00	24.00	429.73	223.78	12.15	3.04	197.27	119.34	12.15	3.04
BH-21	1.00	30.00	27.50	24.50	436.88	229.34	12.49	3.12	200.54	122.18	12.49	3.12
BH-21	1.20	22.00	19.50	16.50	467.36	183.52	13.94	3.49	238.37	107.15	13.94	3.49
BH-21	1.20	23.50	21.00	18.00	496.52	206.31	14.41	3.60	253.54	120.15	14.41	3.60
BH-21	1.20	25.00	22.50	19.50	525.69	229.10	14.88	3.72	268.71	133.14	14.88	3.72
BH-21	1.20	26.50	24.00	21.00	555.26	251.89	15.33	3.83	284.30	146.14	15.33	3.83
BH-21	1.20	28.00	25.50	22.50	584.42	274.67	15.78	3.95	299.47	159.14	15.78	3.95
BH-21	1.20	29.50	27.00	24.00	613.58	297.46	15.78	3.95	314.65	172.13	15.78	3.95
BH-21	1.20	30.00	27.50	24.50	623.30	305.06	16.23	4.06	319.71	176.46	16.23	4.06
BH-22	1.00	22.00	19.50	16.50	311.71	150.77	9.98	2.50	152.74	85.77	9.98	2.50
BH-22	1.00	23.50	21.00	18.00	333.17	167.24	10.36	2.59	163.32	94.62	10.36	2.59
BH-22	1.00	25.00	22.50	19.50	389.85	184.77	10.73	2.68	191.19	103.99	10.73	2.68
BH-22	1.00	26.50	24.00	21.00	412.29	202.30	10.73	2.68	201.98	113.36	10.73	2.68
BH-22	1.00	28.00	25.50	22.50	417.24	219.30	11.10	2.77	204.24	122.47	11.10	2.77

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-22	1.00	29.50	27.00	24.00	439.17	236.30	11.10	2.77	214.90	131.58	11.10	2.77
BH-22	1.00	30.00	27.50	24.50	463.71	242.14	11.45	2.86	226.97	134.71	11.45	2.86
BH-22	1.20	22.00	19.50	16.50	439.90	195.07	12.97	3.24	233.28	117.06	12.97	3.24
BH-22	1.20	23.50	21.00	18.00	468.81	217.33	13.46	3.36	249.13	130.19	13.46	3.36
BH-22	1.20	25.00	22.50	19.50	554.06	241.01	13.94	3.49	295.69	144.08	13.94	3.49
BH-22	1.20	26.50	24.00	21.00	584.08	264.69	13.94	3.49	311.73	157.97	13.94	3.49
BH-22	1.20	28.00	25.50	22.50	586.14	287.66	14.41	3.60	312.61	171.47	14.41	3.60
BH-22	1.20	29.50	27.00	24.00	615.56	310.63	14.41	3.60	328.51	184.98	14.41	3.60
BH-22	1.20	30.00	27.50	24.50	653.08	318.53	14.88	3.72	349.01	189.61	14.88	3.72
BH-23	1.00	22.00	19.50	16.50	303.48	142.54	9.98	2.50	151.63	81.99	9.98	2.50
BH-23	1.00	23.50	21.00	18.00	323.46	158.12	9.98	2.50	161.76	90.67	9.98	2.50
BH-23	1.00	25.00	22.50	19.50	359.48	174.18	10.36	2.59	180.07	99.59	10.36	2.59
BH-23	1.00	26.50	24.00	21.00	379.98	190.24	10.73	2.68	190.37	108.51	10.73	2.68
BH-23	1.00	28.00	25.50	22.50	400.57	206.30	11.10	2.77	200.76	117.43	11.10	2.77
BH-23	1.00	29.50	27.00	24.00	421.15	222.37	11.45	2.86	211.14	126.36	11.45	2.86
BH-23	1.00	30.00	27.50	24.50	428.02	227.72	11.80	2.95	214.61	129.33	11.80	2.95
BH-23	1.20	22.00	19.50	16.50	433.91	185.27	12.97	3.24	236.01	112.61	12.97	3.24
BH-23	1.20	23.50	21.00	18.00	461.04	206.54	12.97	3.24	251.31	125.59	12.97	3.24
BH-23	1.20	25.00	22.50	19.50	514.10	228.46	13.46	3.36	281.32	138.95	13.46	3.36
BH-23	1.20	26.50	24.00	21.00	541.87	250.38	13.94	3.49	296.85	152.30	13.94	3.49
BH-23	1.20	28.00	25.50	22.50	569.79	272.30	14.41	3.60	312.53	165.65	14.41	3.60
BH-23	1.20	29.50	27.00	24.00	597.71	294.22	14.88	3.72	328.22	179.01	14.88	3.72
BH-23	1.20	30.00	27.50	24.50	607.02	301.53	15.33	3.83	333.45	183.46	15.33	3.83
BH-24	1.00	22.00	19.50	19.50	350.72	157.34	10.16	2.54	166.14	86.42	10.16	2.54
BH-24	1.00	23.50	21.00	21.00	372.75	174.41	10.16	2.54	176.52	95.33	10.16	2.54

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-24	1.00	25.00	22.50	22.50	394.78	191.48	10.16	2.54	186.89	104.25	10.16	2.54
BH-24	1.00	26.50	24.00	24.00	416.81	208.56	10.16	2.54	197.27	113.16	10.16	2.54
BH-24	1.00	28.00	25.50	25.50	438.84	225.63	10.45	2.61	207.64	122.07	10.45	2.61
BH-24	1.00	29.50	27.00	27.00	460.87	242.70	10.45	2.61	218.02	130.98	10.45	2.61
BH-24	1.00	30.00	27.50	27.50	468.21	248.39	10.74	2.68	221.47	133.95	10.74	2.68
BH-24	1.20	22.00	19.50	19.50	502.03	203.92	13.30	3.32	260.56	118.81	13.30	3.32
BH-24	1.20	23.50	21.00	21.00	531.79	227.12	13.30	3.32	276.33	132.23	13.30	3.32
BH-24	1.20	25.00	22.50	22.50	561.55	250.33	13.30	3.32	292.10	145.64	13.30	3.32
BH-24	1.20	26.50	24.00	24.00	591.30	273.53	13.30	3.32	307.87	159.06	13.30	3.32
BH-24	1.20	28.00	25.50	25.50	621.06	296.74	13.68	3.42	323.64	172.47	13.68	3.42
BH-24	1.20	29.50	27.00	27.00	650.82	319.94	13.68	3.42	339.41	185.88	13.68	3.42
BH-24	1.20	30.00	27.50	27.50	660.74	327.68	14.06	3.51	344.67	190.36	14.06	3.51
BH-25	1.00	22.00	19.50	18.00	318.17	155.38	11.06	2.77	154.30	86.94	11.06	2.77
BH-25	1.00	23.50	21.00	19.50	339.28	171.80	11.06	2.77	164.53	95.75	11.06	2.77
BH-25	1.00	25.00	22.50	21.00	360.39	188.22	11.38	2.85	174.76	104.56	11.38	2.85
BH-25	1.00	26.50	24.00	22.50	381.49	204.65	11.38	2.85	184.98	113.36	11.38	2.85
BH-25	1.00	28.00	25.50	24.00	438.00	222.13	11.70	2.93	212.68	122.68	11.70	2.93
BH-25	1.00	29.50	27.00	25.50	460.61	239.60	11.70	2.93	223.63	132.00	11.70	2.93
BH-25	1.00	30.00	27.50	26.00	468.15	245.43	12.01	3.00	227.29	135.11	12.01	3.00
BH-25	1.20	22.00	19.50	18.00	471.62	207.00	14.39	3.60	239.83	119.72	14.39	3.60
BH-25	1.20	23.50	21.00	19.50	501.97	230.62	14.39	3.60	255.50	133.06	14.39	3.60
BH-25	1.20	25.00	22.50	21.00	532.32	254.24	14.81	3.70	271.16	146.40	14.81	3.70
BH-25	1.20	26.50	24.00	22.50	562.67	277.87	14.81	3.70	286.83	159.74	14.81	3.70
BH-25	1.20	28.00	25.50	24.00	653.68	303.00	15.22	3.81	334.31	173.86	15.22	3.81
BH-25	1.20	29.50	27.00	25.50	686.20	328.14	15.22	3.81	351.09	187.98	15.22	3.81

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-25	1.20	30.00	27.50	26.00	697.04	336.52	15.63	3.91	356.69	192.69	15.63	3.91
BH-26	1.00	22.00	19.50	18.00	295.95	137.12	8.99	2.25	152.37	80.33	8.99	2.25
BH-26	1.00	23.50	21.00	19.50	314.63	151.68	9.36	2.34	162.31	88.77	9.36	2.34
BH-26	1.00	25.00	22.50	21.00	333.08	166.24	10.06	2.51	172.01	97.20	10.06	2.51
BH-26	1.00	26.50	24.00	22.50	351.52	180.80	10.40	2.60	181.71	105.64	10.40	2.60
BH-26	1.00	28.00	25.50	24.00	369.96	195.35	10.73	2.68	191.41	114.08	10.73	2.68
BH-26	1.00	29.50	27.00	25.50	388.40	209.91	10.73	2.68	201.11	122.52	10.73	2.68
BH-26	1.00	30.00	27.50	26.00	394.55	214.77	11.06	2.77	204.35	125.34	11.06	2.77
BH-26	1.20	22.00	19.50	18.00	430.15	179.51	11.71	2.93	242.87	111.36	11.71	2.93
BH-26	1.20	23.50	21.00	19.50	456.05	199.73	12.18	3.05	258.28	124.23	12.18	3.05
BH-26	1.20	25.00	22.50	21.00	481.54	219.94	13.09	3.27	273.28	137.11	13.09	3.27
BH-26	1.20	26.50	24.00	22.50	507.02	240.16	13.53	3.38	288.27	149.98	13.53	3.38
BH-26	1.20	28.00	25.50	24.00	532.51	260.38	13.97	3.49	303.27	162.85	13.97	3.49
BH-26	1.20	29.50	27.00	25.50	558.00	280.59	13.97	3.49	318.27	175.72	13.97	3.49
BH-26	1.20	30.00	27.50	26.00	566.50	287.33	14.39	3.60	323.26	180.02	14.39	3.60
BH-27	1.00	22.00	19.50	19.50	329.55	149.82	10.74	2.68	163.95	84.90	10.74	2.68
BH-27	1.00	23.50	21.00	21.00	350.12	165.87	11.02	2.76	174.33	93.81	11.02	2.76
BH-27	1.00	25.00	22.50	22.50	370.69	181.92	11.02	2.76	184.70	102.72	11.02	2.76
BH-27	1.00	26.50	24.00	24.00	391.26	197.97	11.30	2.83	195.07	111.63	11.30	2.83
BH-27	1.00	28.00	25.50	25.50	411.84	214.02	11.30	2.83	205.45	120.54	11.30	2.83
BH-27	1.00	29.50	27.00	27.00	432.41	230.07	11.30	2.83	215.82	129.45	11.30	2.83
BH-27	1.00	30.00	27.50	27.50	439.27	235.42	11.58	2.89	219.28	132.42	11.58	2.89
BH-27	1.20	22.00	19.50	19.50	477.95	195.68	14.06	3.51	261.76	117.78	14.06	3.51
BH-27	1.20	23.50	21.00	21.00	506.27	217.88	14.43	3.61	277.84	131.41	14.43	3.61
BH-27	1.20	25.00	22.50	22.50	534.60	240.08	14.43	3.61	293.92	145.04	14.43	3.61

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-27	1.20	26.50	24.00	24.00	562.92	262.28	14.79	3.70	310.00	158.68	14.79	3.70
BH-27	1.20	28.00	25.50	25.50	591.24	284.48	14.79	3.70	326.09	172.31	14.79	3.70
BH-27	1.20	29.50	27.00	27.00	619.56	306.68	14.79	3.70	342.17	185.94	14.79	3.70
BH-27	1.20	30.00	27.50	27.50	629.00	314.08	15.15	3.79	347.53	190.49	15.15	3.79
BH-28	1.00	22.00	19.50	15.00	296.63	131.43	10.07	2.52	141.74	74.01	10.07	2.52
BH-28	1.00	23.50	21.00	16.50	316.27	146.83	10.48	2.62	151.18	82.27	10.48	2.62
BH-28	1.00	25.00	22.50	18.00	335.91	162.23	10.48	2.62	160.63	90.53	10.48	2.62
BH-28	1.00	26.50	24.00	19.50	355.55	177.62	10.48	2.62	170.07	98.78	10.48	2.62
BH-28	1.00	28.00	25.50	21.00	375.19	193.02	10.48	2.62	179.51	107.04	10.48	2.62
BH-28	1.00	29.50	27.00	22.50	394.83	208.42	10.48	2.62	188.95	115.30	10.48	2.62
BH-28	1.00	30.00	27.50	23.00	401.38	213.55	10.87	2.72	192.10	118.05	10.87	2.72
BH-28	1.20	22.00	19.50	15.00	432.91	172.53	13.10	3.27	229.57	103.62	13.10	3.27
BH-28	1.20	23.50	21.00	16.50	459.84	193.75	13.63	3.41	244.26	116.28	13.63	3.41
BH-28	1.20	25.00	22.50	18.00	486.77	214.98	13.63	3.41	258.94	128.93	13.63	3.41
BH-28	1.20	26.50	24.00	19.50	513.69	236.20	13.63	3.41	273.63	141.59	13.63	3.41
BH-28	1.20	28.00	25.50	21.00	540.62	257.42	13.63	3.41	288.32	154.25	13.63	3.41
BH-28	1.20	29.50	27.00	22.50	567.54	278.64	13.63	3.41	303.00	166.90	13.63	3.41
BH-28	1.20	30.00	27.50	23.00	576.52	285.72	14.14	3.54	307.90	171.12	14.14	3.54
BH-28A	1.00	22.00	19.50	19.50	329.14	145.70	8.28	2.07	150.78	79.14	8.28	2.07
BH-28A	1.00	23.50	21.00	21.00	350.50	162.30	8.28	2.07	160.48	87.58	8.28	2.07
BH-28A	1.00	25.00	22.50	22.50	371.86	178.91	8.61	2.15	170.19	96.02	8.61	2.15
BH-28A	1.00	26.50	24.00	24.00	393.22	195.51	8.61	2.15	179.89	104.46	8.61	2.15
BH-28A	1.00	28.00	25.50	25.50	414.58	212.11	8.61	2.15	189.59	112.90	8.61	2.15
BH-28A	1.00	29.50	27.00	27.00	435.94	228.71	8.61	2.15	199.30	121.34	8.61	2.15
BH-28A	1.00	30.00	27.50	27.50	443.05	234.24	8.61	2.15	202.53	124.16	8.61	2.15

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-28A	1.20	22.00	19.50	19.50	473.07	189.28	10.85	2.71	239.06	109.40	10.85	2.71
BH-28A	1.20	23.50	21.00	21.00	501.92	211.85	10.85	2.71	253.92	122.18	10.85	2.71
BH-28A	1.20	25.00	22.50	22.50	530.77	234.42	11.28	2.82	268.78	134.96	11.28	2.82
BH-28A	1.20	26.50	24.00	24.00	559.62	256.99	11.28	2.82	283.64	147.74	11.28	2.82
BH-28A	1.20	28.00	25.50	25.50	588.46	279.56	11.28	2.82	298.50	160.51	11.28	2.82
BH-28A	1.20	29.50	27.00	27.00	617.31	302.13	11.28	2.82	313.37	173.29	11.28	2.82
BH-28A	1.20	30.00	27.50	27.50	626.93	309.65	11.28	2.82	318.32	177.55	11.28	2.82
BH-29	1.00	22.00	19.50	19.50	343.58	152.48	8.93	2.23	162.51	84.01	8.93	2.23
BH-29	1.00	23.50	21.00	21.00	365.61	169.55	8.93	2.23	172.88	92.92	8.93	2.23
BH-29	1.00	25.00	22.50	22.50	387.64	186.62	8.93	2.23	183.25	101.83	8.93	2.23
BH-29	1.00	26.50	24.00	24.00	409.66	203.68	8.93	2.23	193.62	110.73	8.93	2.23
BH-29	1.00	28.00	25.50	25.50	431.69	220.75	8.93	2.23	203.99	119.64	8.93	2.23
BH-29	1.00	29.50	27.00	27.00	453.72	237.82	8.93	2.23	214.36	128.55	8.93	2.23
BH-29	1.00	30.00	27.50	27.50	461.06	243.51	8.93	2.23	217.82	131.52	8.93	2.23
BH-29	1.20	22.00	19.50	19.50	493.05	197.63	11.70	2.93	255.77	115.47	11.70	2.93
BH-29	1.20	23.50	21.00	21.00	522.84	220.86	11.70	2.93	271.58	128.90	11.70	2.93
BH-29	1.20	25.00	22.50	22.50	552.63	244.09	11.70	2.93	287.38	142.34	11.70	2.93
BH-29	1.20	26.50	24.00	24.00	582.41	267.31	11.70	2.93	303.18	155.77	11.70	2.93
BH-29	1.20	28.00	25.50	25.50	612.20	290.54	11.70	2.93	318.98	169.21	11.70	2.93
BH-29	1.20	29.50	27.00	27.00	641.99	313.77	11.70	2.93	334.78	182.64	11.70	2.93
BH-29	1.20	30.00	27.50	27.50	651.92	321.51	11.70	2.93	340.05	187.12	11.70	2.93
BH-30	1.00	22.00	19.50	19.50	331.15	148.71	8.61	2.15	149.54	79.87	8.61	2.15
BH-30	1.00	23.50	21.00	21.00	352.18	165.09	8.61	2.15	158.92	88.08	8.61	2.15
BH-30	1.00	25.00	22.50	22.50	373.22	181.47	8.93	2.23	168.30	96.30	8.93	2.23
BH-30	1.00	26.50	24.00	24.00	394.26	197.84	8.93	2.23	177.68	104.52	8.93	2.23

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-30	1.00	28.00	25.50	25.50	415.30	214.22	8.93	2.23	187.06	112.74	8.93	2.23
BH-30	1.00	29.50	27.00	27.00	436.34	230.59	8.93	2.23	196.45	120.95	8.93	2.23
BH-30	1.00	30.00	27.50	27.50	443.35	236.05	8.93	2.23	199.57	123.69	8.93	2.23
BH-30	1.20	22.00	19.50	19.50	476.43	193.33	11.28	2.82	238.52	110.71	11.28	2.82
BH-30	1.20	23.50	21.00	21.00	505.00	215.70	11.28	2.82	253.10	123.29	11.28	2.82
BH-30	1.20	25.00	22.50	22.50	533.57	238.07	11.70	2.93	267.68	135.88	11.70	2.93
BH-30	1.20	26.50	24.00	24.00	562.13	260.44	11.70	2.93	282.26	148.46	11.70	2.93
BH-30	1.20	28.00	25.50	25.50	590.70	282.82	11.70	2.93	296.84	161.04	11.70	2.93
BH-30	1.20	29.50	27.00	27.00	619.27	305.19	11.70	2.93	311.41	173.62	11.70	2.93
BH-30	1.20	30.00	27.50	27.50	628.79	312.65	11.70	2.93	316.27	177.81	11.70	2.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-21	-
Chainage	2+605	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	216.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	14.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-21	1.00	22.00	19.50	16.50	322.22	140.44	10.73	2.68
BH-21	1.00	23.50	21.00	18.00	343.67	157.11	11.10	2.77
BH-21	1.00	25.00	22.50	19.50	365.13	173.78	11.45	2.86
BH-21	1.00	26.50	24.00	21.00	386.82	190.45	11.80	2.95
BH-21	1.00	28.00	25.50	22.50	408.28	207.11	12.15	3.04
BH-21	1.00	29.50	27.00	24.00	429.73	223.78	12.15	3.04
BH-21	1.00	30.00	27.50	24.50	436.88	229.34	12.49	3.12

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.55	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.16	26.33	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.55	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.49	52.65	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	65.81	78.98	4.71	0.00	66.43	66.43	26.57	7.70
4	7.00	8.50	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	92.14	105.30	4.71	18.25	86.72	104.98	41.99	14.46
5	8.50	10.00	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	118.46	131.63	4.71	25.42	145.10	188.77	75.51	23.22
6	10.00	11.50	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	144.79	157.95	4.71	31.07	172.47	247.22	98.89	33.57
7	11.50	13.00	1.50	Granular	19.55	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	172.61	187.28	4.71	39.89	275.09	389.73	155.89	46.39
8	13.00	14.50	1.50	Granular	19.55	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	201.94	216.60	4.71	46.67	316.27	477.58	191.03	61.11
9	14.50	16.00	1.50	Granular	9.74	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	216.60	216.60	4.71	48.27	270.00	479.59	191.83	76.28
10	16.00	17.50	1.50	Granular	9.41	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	216.60	216.60	4.71	48.27	269.82	527.68	211.07	91.44
11	17.50	19.00	1.50	Granular	9.41	0.04	29	-	17.60	20.13	1.00	-	18.25	19.00	216.60	216.60	4.71	51.85	350.17	659.88	263.95	107.61
12	19.00	20.50	1.50	Granular	9.41	0.04	29	-	17.60	20.13	1.00	-	19.75	20.50	216.60	216.60	4.71	51.85	350.17	711.73	284.69	123.78
13	20.50	22.00	1.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	216.60	216.60	4.71	53.64	390.35	805.55	322.22	140.44
14	22.00	23.50	1.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	216.60	216.60	4.71	53.64	390.35	859.18	343.67	157.11
15	23.50	25.00	1.50	Granular	9.41	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	216.60	216.60	4.71	53.64	390.35	912.82	365.13	173.78
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	216.60	216.60	4.71	53.64	390.95	967.05	386.82	190.45
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	216.60	216.60	4.71	53.64	390.95	1020.69	408.28	207.11
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	216.60	216.60	4.71	53.64	390.95	1074.33	429.73	223.78
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	216.60	216.60	1.57	17.88	390.95	1092.21	436.88	229.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
2	22.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
3	24.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
6	28.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-21	-
Chainage	2+605	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	245.34	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	14.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-21	1.20	22.00	19.50	16.50	467.36	183.52	13.94	3.49
BH-21	1.20	23.50	21.00	18.00	496.52	206.31	14.41	3.60
BH-21	1.20	25.00	22.50	19.50	525.69	229.10	14.88	3.72
BH-21	1.20	26.50	24.00	21.00	555.26	251.89	15.33	3.83
BH-21	1.20	28.00	25.50	22.50	584.42	274.67	15.78	3.95
BH-21	1.20	29.50	27.00	24.00	613.58	297.46	15.78	3.95
BH-21	1.20	30.00	27.50	24.50	623.30	305.06	16.23	4.06

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.55	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.16	26.33	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.55	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.49	52.65	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	65.81	78.98	5.65	0.00	97.25	97.25	38.90	11.08
4	7.00	8.50	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	92.14	105.30	5.65	21.90	126.48	148.38	59.35	19.59
5	8.50	10.00	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	118.46	131.63	5.65	30.51	211.31	263.72	105.49	30.51
6	10.00	11.50	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	144.79	157.95	5.65	37.29	250.73	340.43	136.17	43.32
7	11.50	13.00	1.50	Granular	19.55	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	172.61	187.28	5.65	47.87	399.61	537.18	214.87	59.10
8	13.00	14.50	1.50	Granular	19.55	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	201.94	216.60	5.65	56.01	458.91	652.49	261.00	77.16
9	14.50	16.00	1.50	Granular	9.74	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	223.91	231.22	5.65	59.88	416.04	669.50	267.80	96.30
10	16.00	17.50	1.50	Granular	9.41	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	238.28	245.34	5.65	63.72	440.58	757.76	303.11	116.52
11	17.50	19.00	1.50	Granular	9.41	0.04	29	-	17.60	20.13	1.00	-	18.25	19.00	245.34	245.34	5.65	70.47	571.78	959.44	383.77	138.63
12	19.00	20.50	1.50	Granular	9.41	0.04	29	-	17.60	20.13	1.00	-	19.75	20.50	245.34	245.34	5.65	70.47	571.78	1029.91	411.96	160.73
13	20.50	22.00	1.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	245.34	245.34	5.65	72.90	637.38	1168.41	467.36	183.52
14	22.00	23.50	1.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	245.34	245.34	5.65	72.90	637.38	1241.31	496.52	206.31
15	23.50	25.00	1.50	Granular	9.41	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	245.34	245.34	5.65	72.90	637.38	1314.21	525.69	229.10
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	245.34	245.34	5.65	72.90	638.42	1388.15	555.26	251.89
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	245.34	245.34	5.65	72.90	638.42	1461.05	584.42	274.67
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	245.34	245.34	5.65	72.90	638.42	1533.96	613.58	297.46
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	245.34	245.34	1.88	24.30	638.42	1558.26	623.30	305.06

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
2	22.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
3	24.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
6	28.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-22	-
Chainage	2+719	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	229.01	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	15.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-22	1.00	22.00	19.50	16.50	311.71	150.77	9.98	2.50
BH-22	1.00	23.50	21.00	18.00	333.17	167.24	10.36	2.59
BH-22	1.00	25.00	22.50	19.50	389.85	184.77	10.73	2.68
BH-22	1.00	26.50	24.00	21.00	412.29	202.30	10.73	2.68
BH-22	1.00	28.00	25.50	22.50	417.24	219.30	11.10	2.77
BH-22	1.00	29.50	27.00	24.00	439.17	236.30	11.10	2.77
BH-22	1.00	30.00	27.50	24.50	463.71	242.14	11.45	2.86

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	19.12	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	14.34	28.68	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	19.12	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	43.02	57.36	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	19.12	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	71.70	86.04	4.71	15.39	98.43	113.82	45.53	12.01
4	7.00	8.50	1.50	Granular	19.12	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	100.38	114.72	4.71	21.54	128.26	165.19	66.07	19.69
5	8.50	10.00	1.50	Granular	19.12	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	129.06	143.40	4.71	27.70	158.08	222.71	89.08	29.09
6	10.00	11.50	1.50	Granular	19.12	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	157.74	172.08	4.71	33.85	187.90	286.38	114.55	40.22
7	11.50	13.00	1.50	Granular	19.12	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	186.42	200.76	4.71	43.09	293.76	435.32	174.13	53.93
8	13.00	14.50	1.50	Granular	18.83	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	214.88	229.01	4.71	49.66	333.24	524.47	209.79	69.49
9	14.50	16.00	1.50	Granular	9.02	0.06	27	-	13.80	15.50	1.00	-	15.25	16.00	229.01	229.01	4.71	51.04	284.77	527.03	210.81	85.43
10	16.00	17.50	1.50	Granular	9.02	0.06	27	-	13.80	15.50	1.00	-	16.75	17.50	229.01	229.01	4.71	51.04	284.77	578.07	231.23	101.37
11	17.50	19.00	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	18.25	19.00	229.01	229.01	4.71	52.93	327.18	673.41	269.36	117.84
12	19.00	20.50	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	19.75	20.50	229.01	229.01	4.71	52.93	327.18	726.34	290.53	134.31
13	20.50	22.00	1.50	Granular	9.02	0.07	28	-	15.70	17.82	1.00	-	21.25	22.00	229.01	229.01	4.71	52.93	327.18	779.26	311.71	150.77
14	22.00	23.50	1.50	Granular	10.19	0.07	28	-	15.70	17.82	1.00	-	22.75	23.50	229.01	229.01	4.71	52.93	327.90	832.91	333.17	167.24
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	229.01	229.01	4.71	56.71	412.89	974.62	389.85	184.77
16	25.00	26.50	1.50	Granular	9.41	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	229.01	229.01	4.71	56.71	412.29	1030.72	412.29	202.30
17	26.50	28.00	1.50	Granular	9.41	0.12	29	-	17.60	20.13	1.00	-	27.25	28.00	229.01	229.01	4.71	54.82	369.86	1043.10	417.24	219.30
18	28.00	29.50	1.50	Granular	9.41	0.12	29	-	17.60	20.13	1.00	-	28.75	29.50	229.01	229.01	4.71	54.82	369.86	1097.92	439.17	236.30
19	29.50	30.00	0.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	229.01	229.01	1.57	18.90	412.29	1159.26	463.71	242.14

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
6	28.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
7	30.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-22	-
Chainage	2+719	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	256.08	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	15.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-22	1.20	22.00	19.50	16.50	439.90	195.07	12.97	3.24
BH-22	1.20	23.50	21.00	18.00	468.81	217.33	13.46	3.36
BH-22	1.20	25.00	22.50	19.50	554.06	241.01	13.94	3.49
BH-22	1.20	26.50	24.00	21.00	584.08	264.69	13.94	3.49
BH-22	1.20	28.00	25.50	22.50	586.14	287.66	14.41	3.60
BH-22	1.20	29.50	27.00	24.00	615.56	310.63	14.41	3.60
BH-22	1.20	30.00	27.50	24.50	653.08	318.53	14.88	3.72

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	19.12	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	14.34	28.68	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	19.12	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	43.02	57.36	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	19.12	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	71.70	86.04	5.65	18.47	144.33	162.79	65.12	16.25
4	7.00	8.50	1.50	Granular	19.12	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	100.38	114.72	5.65	25.85	187.27	231.59	92.64	25.87
5	8.50	10.00	1.50	Granular	19.12	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	129.06	143.40	5.65	33.24	230.22	307.77	123.11	37.55
6	10.00	11.50	1.50	Granular	19.12	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	157.74	172.08	5.65	40.62	273.16	391.34	156.53	51.30
7	11.50	13.00	1.50	Granular	19.12	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	186.42	200.76	5.65	51.70	426.42	596.30	238.52	68.15
8	13.00	14.50	1.50	Granular	18.83	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	214.88	229.01	5.65	59.60	483.23	712.70	285.08	87.21
9	14.50	16.00	1.50	Granular	9.02	0.06	27	-	13.80	15.50	1.00	-	15.25	16.00	235.77	242.54	5.65	63.05	435.30	727.83	291.13	107.24
10	16.00	17.50	1.50	Granular	9.02	0.06	27	-	13.80	15.50	1.00	-	16.75	17.50	249.31	256.08	5.65	66.67	459.11	818.32	327.33	128.29
11	17.50	19.00	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	18.25	19.00	256.08	256.08	5.65	71.02	527.48	957.71	383.08	150.55
12	19.00	20.50	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	19.75	20.50	256.08	256.08	5.65	71.02	527.48	1028.73	411.49	172.81
13	20.50	22.00	1.50	Granular	9.02	0.07	28	-	15.70	17.82	1.00	-	21.25	22.00	256.08	256.08	5.65	71.02	527.48	1099.75	439.90	195.07
14	22.00	23.50	1.50	Granular	10.19	0.07	28	-	15.70	17.82	1.00	-	22.75	23.50	256.08	256.08	5.65	71.02	528.73	1172.02	468.81	217.33
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	256.08	256.08	5.65	76.09	665.77	1385.15	554.06	241.01
16	25.00	26.50	1.50	Granular	9.41	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	256.08	256.08	5.65	76.09	664.73	1460.21	584.08	264.69
17	26.50	28.00	1.50	Granular	9.41	0.12	29	-	17.60	20.13	1.00	-	27.25	28.00	256.08	256.08	5.65	73.56	596.32	1465.35	586.14	287.66
18	28.00	29.50	1.50	Granular	9.41	0.12	29	-	17.60	20.13	1.00	-	28.75	29.50	256.08	256.08	5.65	73.56	596.32	1538.91	615.56	310.63
19	29.50	30.00	0.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	256.08	256.08	1.88	25.36	664.73	1632.69	653.08	318.53

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
6	28.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
7	30.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-23	-
Chainage	2+823	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	207.85	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-23	1.00	22.00	19.50	16.50	303.48	142.54	9.98	2.50
BH-23	1.00	23.50	21.00	18.00	323.46	158.12	9.98	2.50
BH-23	1.00	25.00	22.50	19.50	359.48	174.18	10.36	2.59
BH-23	1.00	26.50	24.00	21.00	379.98	190.24	10.73	2.68
BH-23	1.00	28.00	25.50	22.50	400.57	206.30	11.10	2.77
BH-23	1.00	29.50	27.00	24.00	421.15	222.37	11.45	2.86
BH-23	1.00	30.00	27.50	24.50	428.02	227.72	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.97	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.73	25.46	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.97	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.18	50.91	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	19.12	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	65.25	79.59	4.71	13.46	75.79	89.26	35.70	11.47
4	7.00	8.50	1.50	Granular	19.12	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	93.93	108.27	4.71	19.38	100.39	133.23	53.29	18.54
5	8.50	10.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	122.61	136.95	4.71	28.34	204.15	265.34	106.13	28.13
6	10.00	11.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	151.29	165.63	4.71	34.97	244.43	340.58	136.23	39.57
7	11.50	13.00	1.50	Granular	19.12	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	179.97	194.31	4.71	41.59	284.70	422.45	168.98	52.86
8	13.00	14.50	1.50	Granular	9.02	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	201.08	207.85	4.71	46.47	297.46	481.68	192.67	67.52
9	14.50	16.00	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	207.85	207.85	4.71	46.32	258.91	489.45	195.78	82.14
10	16.00	17.50	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	207.85	207.85	4.71	46.32	258.91	535.77	214.31	96.76
11	17.50	19.00	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	18.25	19.00	207.85	207.85	4.71	48.04	297.46	622.36	248.94	111.86
12	19.00	20.50	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	19.75	20.50	207.85	207.85	4.71	48.04	297.46	670.40	268.16	126.96
13	20.50	22.00	1.50	Granular	9.02	0.00	29	-	17.60	20.13	1.00	-	21.25	22.00	207.85	207.85	4.71	49.75	336.01	758.70	303.48	142.54
14	22.00	23.50	1.50	Granular	9.31	0.00	29	-	17.60	20.13	1.00	-	22.75	23.50	207.85	207.85	4.71	49.75	336.21	808.66	323.46	158.12
15	23.50	25.00	1.50	Granular	9.31	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	207.85	207.85	4.71	51.47	374.79	898.70	359.48	174.18
16	25.00	26.50	1.50	Granular	9.02	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	207.85	207.85	4.71	51.47	374.57	949.94	379.98	190.24
17	26.50	28.00	1.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	207.85	207.85	4.71	51.47	374.57	1001.41	400.57	206.30
18	28.00	29.50	1.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	207.85	207.85	4.71	51.47	374.57	1052.88	421.15	222.37
19	29.50	30.00	0.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	207.85	207.85	1.57	17.16	374.57	1070.04	428.02	227.72

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-23	-
Chainage	2+823	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	234.92	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-23	1.20	22.00	19.50	16.50	433.91	185.27	12.97	3.24
BH-23	1.20	23.50	21.00	18.00	461.04	206.54	12.97	3.24
BH-23	1.20	25.00	22.50	19.50	514.10	228.46	13.46	3.36
BH-23	1.20	26.50	24.00	21.00	541.87	250.38	13.94	3.49
BH-23	1.20	28.00	25.50	22.50	569.79	272.30	14.41	3.60
BH-23	1.20	29.50	27.00	24.00	597.71	294.22	14.88	3.72
BH-23	1.20	30.00	27.50	24.50	607.02	301.53	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.97	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.73	25.46	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.97	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.18	50.91	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	19.12	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	65.25	79.59	5.65	16.16	111.31	127.47	50.99	15.61
4	7.00	8.50	1.50	Granular	19.12	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	93.93	108.27	5.65	23.26	146.73	186.14	74.46	24.50
5	8.50	10.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	122.61	136.95	5.65	34.01	297.38	370.81	148.32	36.39
6	10.00	11.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	151.29	165.63	5.65	41.96	355.38	470.76	188.30	50.52
7	11.50	13.00	1.50	Granular	19.12	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	179.97	194.31	5.65	49.91	413.38	578.67	231.47	66.87
8	13.00	14.50	1.50	Granular	9.02	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	201.08	207.85	5.65	55.77	429.95	651.01	260.41	84.86
9	14.50	16.00	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	214.61	221.38	5.65	57.40	398.06	676.52	270.61	103.30
10	16.00	17.50	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	228.15	234.92	5.65	61.02	421.88	761.35	304.54	122.76
11	17.50	19.00	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	18.25	19.00	234.92	234.92	5.65	65.15	484.69	889.32	355.73	143.38
12	19.00	20.50	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	19.75	20.50	234.92	234.92	5.65	65.15	484.69	954.47	381.79	164.00
13	20.50	22.00	1.50	Granular	9.02	0.00	29	-	17.60	20.13	1.00	-	21.25	22.00	234.92	234.92	5.65	67.48	547.51	1084.76	433.91	185.27
14	22.00	23.50	1.50	Granular	9.31	0.00	29	-	17.60	20.13	1.00	-	22.75	23.50	234.92	234.92	5.65	67.48	547.85	1152.59	461.04	206.54
15	23.50	25.00	1.50	Granular	9.31	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	234.92	234.92	5.65	69.81	610.71	1285.25	514.10	228.46
16	25.00	26.50	1.50	Granular	9.02	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	234.92	234.92	5.65	69.81	610.32	1354.67	541.87	250.38
17	26.50	28.00	1.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	234.92	234.92	5.65	69.81	610.32	1424.48	569.79	272.30
18	28.00	29.50	1.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	234.92	234.92	5.65	69.81	610.32	1494.28	597.71	294.22
19	29.50	30.00	0.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	234.92	234.92	1.88	23.27	610.32	1517.55	607.02	301.53

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-24	-
Chainage	2+920	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	222.42	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	15.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-24	1.00	22.00	19.50	19.50	350.72	157.34	10.16	2.54
BH-24	1.00	23.50	21.00	21.00	372.75	174.41	10.16	2.54
BH-24	1.00	25.00	22.50	22.50	394.78	191.48	10.16	2.54
BH-24	1.00	26.50	24.00	24.00	416.81	208.56	10.16	2.54
BH-24	1.00	28.00	25.50	25.50	438.84	225.63	10.45	2.61
BH-24	1.00	29.50	27.00	27.00	460.87	242.70	10.45	2.61
BH-24	1.00	30.00	27.50	27.50	468.21	248.39	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	13.46	26.93	4.71	2.89	36.42	39.30	15.72	5.21
2	4.00	5.50	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	40.39	53.85	4.71	8.67	64.41	75.97	30.39	9.28
3	5.50	7.00	1.50	Granular	17.95	0.01	27	-	13.80	15.50	1.00	-	6.25	7.00	67.31	80.78	4.71	15.00	108.47	135.03	54.01	15.13
4	7.00	8.50	1.50	Granular	17.95	0.01	27	-	13.80	15.50	1.00	-	7.75	8.50	94.24	107.70	4.71	21.00	141.38	188.94	75.58	22.66
5	8.50	10.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	122.04	136.38	4.71	28.21	203.35	279.12	111.65	32.21
6	10.00	11.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	150.72	165.06	4.71	34.83	243.62	354.23	141.69	43.61
7	11.50	13.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	179.40	193.74	4.71	41.46	283.90	435.96	174.39	56.87
8	13.00	14.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	208.08	222.42	4.71	48.09	324.18	524.33	209.73	71.99
9	14.50	16.00	1.50	Granular	9.31	0.00	30	-	19.50	22.44	1.00	-	15.25	16.00	222.42	222.42	4.71	55.08	400.57	655.80	262.32	89.06
10	16.00	17.50	1.50	Granular	9.31	0.00	30	-	19.50	22.44	1.00	-	16.75	17.50	222.42	222.42	4.71	55.08	400.57	710.88	284.35	106.13
11	17.50	19.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	222.42	222.42	4.71	55.08	401.25	766.63	306.65	123.20
12	19.00	20.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	222.42	222.42	4.71	55.08	401.25	821.71	328.68	140.27
13	20.50	22.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	222.42	222.42	4.71	55.08	401.25	876.79	350.72	157.34
14	22.00	23.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	222.42	222.42	4.71	55.08	401.25	931.87	372.75	174.41
15	23.50	25.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	222.42	222.42	4.71	55.08	401.25	986.94	394.78	191.48
16	25.00	26.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	222.42	222.42	4.71	55.08	401.25	1042.02	416.81	208.56
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	222.42	222.42	4.71	55.08	401.25	1097.10	438.84	225.63
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	222.42	222.42	4.71	55.08	401.25	1152.18	460.87	242.70
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	222.42	222.42	1.57	18.36	401.25	1170.53	468.21	248.39

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
3	24.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
6	28.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-24	-
Chainage	2+920	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	250.36	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	15.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-24	1.20	22.00	19.50	19.50	502.03	203.92	13.30	3.32
BH-24	1.20	23.50	21.00	21.00	531.79	227.12	13.30	3.32
BH-24	1.20	25.00	22.50	22.50	561.55	250.33	13.30	3.32
BH-24	1.20	26.50	24.00	24.00	591.30	273.53	13.30	3.32
BH-24	1.20	28.00	25.50	25.50	621.06	296.74	13.68	3.42
BH-24	1.20	29.50	27.00	27.00	650.82	319.94	13.68	3.42
BH-24	1.20	30.00	27.50	27.50	660.74	327.68	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Coeff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	13.46	26.93	5.65	3.47	54.86	58.33	23.33	7.30
2	4.00	5.50	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	40.39	53.85	5.65	10.40	95.18	109.05	43.62	12.59
3	5.50	7.00	1.50	Granular	17.95	0.01	27	-	13.80	15.50	1.00	-	6.25	7.00	67.31	80.78	5.65	18.00	159.02	190.89	76.35	20.01
4	7.00	8.50	1.50	Granular	17.95	0.01	27	-	13.80	15.50	1.00	-	7.75	8.50	94.24	107.70	5.65	25.20	206.40	263.47	105.39	29.44
5	8.50	10.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	122.04	136.38	5.65	33.85	296.23	387.15	154.86	41.29
6	10.00	11.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	150.72	165.06	5.65	41.80	354.23	486.95	194.78	55.37
7	11.50	13.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	179.40	193.74	5.65	49.76	412.22	594.70	237.88	71.68
8	13.00	14.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	208.08	222.42	5.65	57.71	470.22	710.41	284.16	90.21
9	14.50	16.00	1.50	Granular	9.31	0.00	30	-	19.50	22.44	1.00	-	15.25	16.00	229.41	236.39	5.65	68.17	614.46	922.82	369.13	111.67
10	16.00	17.50	1.50	Granular	9.31	0.00	30	-	19.50	22.44	1.00	-	16.75	17.50	243.38	250.36	5.65	72.32	650.05	1030.72	412.29	134.30
11	17.50	19.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	250.36	250.36	5.65	74.40	651.21	1106.28	442.51	157.50
12	19.00	20.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	250.36	250.36	5.65	74.40	651.21	1180.68	472.27	180.71
13	20.50	22.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	250.36	250.36	5.65	74.40	651.21	1255.08	502.03	203.92
14	22.00	23.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	250.36	250.36	5.65	74.40	651.21	1329.47	531.79	227.12
15	23.50	25.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	250.36	250.36	5.65	74.40	651.21	1403.87	561.55	250.33
16	25.00	26.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	250.36	250.36	5.65	74.40	651.21	1478.26	591.30	273.53
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	250.36	250.36	5.65	74.40	651.21	1552.66	621.06	296.74
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	250.36	250.36	5.65	74.40	651.21	1627.05	650.82	319.94
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	250.36	250.36	1.88	24.80	651.21	1651.85	660.74	327.68

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
3	24.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
6	28.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-25	-
Chainage	2+033	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	228.30	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	16.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-25	1.00	22.00	19.50	18.00	318.17	155.38	11.06	2.77
BH-25	1.00	23.50	21.00	19.50	339.28	171.80	11.06	2.77
BH-25	1.00	25.00	22.50	21.00	360.39	188.22	11.38	2.85
BH-25	1.00	26.50	24.00	22.50	381.49	204.65	11.38	2.85
BH-25	1.00	28.00	25.50	24.00	438.00	222.13	11.70	2.93
BH-25	1.00	29.50	27.00	25.50	460.61	239.60	11.70	2.93
BH-25	1.00	30.00	27.50	26.00	468.15	245.43	12.01	3.00

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.10	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	38.48	51.30	4.71	8.26	61.36	69.62	27.85	8.36
3	5.50	7.00	1.50	Granular	19.50	0.03	28	-	15.70	17.82	1.00	-	6.25	7.00	65.93	80.55	4.71	15.24	125.18	148.68	59.47	14.28
4	7.00	8.50	1.50	Granular	19.50	0.03	28	-	15.70	17.82	1.00	-	7.75	8.50	95.18	109.80	4.71	22.00	166.26	211.75	84.70	22.08
5	8.50	10.00	1.50	Granular	19.50	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	124.43	139.05	4.71	28.76	207.33	281.58	112.63	31.78
6	10.00	11.50	1.50	Granular	19.50	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	153.68	168.30	4.71	35.52	248.41	358.17	143.27	43.38
7	11.50	13.00	1.50	Granular	20.00	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	183.30	198.30	4.71	43.88	328.48	482.13	192.85	57.31
8	13.00	14.50	1.50	Granular	20.00	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	213.30	228.30	4.71	51.06	376.08	580.78	232.31	73.26
9	14.50	16.00	1.50	Granular	20.00	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	228.30	228.30	4.71	50.88	289.87	545.46	218.18	89.16
10	16.00	17.50	1.50	Granular	10.19	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	228.30	228.30	4.71	50.88	284.54	591.00	236.40	105.05
11	17.50	19.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	18.25	19.00	228.30	228.30	4.71	54.65	369.28	730.39	292.16	122.00
12	19.00	20.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	19.75	20.50	228.30	228.30	4.71	54.65	369.28	785.04	314.01	138.95
13	20.50	22.00	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	21.25	22.00	228.30	228.30	4.71	52.76	326.91	795.43	318.17	155.38
14	22.00	23.50	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	22.75	23.50	228.30	228.30	4.71	52.76	326.91	848.20	339.28	171.80
15	23.50	25.00	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	24.25	25.00	228.30	228.30	4.71	52.76	326.91	900.96	360.39	188.22
16	25.00	26.50	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	25.75	26.50	228.30	228.30	4.71	52.76	326.91	953.73	381.49	204.65
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	228.30	228.30	4.71	56.53	411.65	1095.00	438.00	222.13
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	228.30	228.30	4.71	56.53	411.65	1151.53	460.61	239.60
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	228.30	228.30	1.57	18.84	411.65	1170.38	468.15	245.43

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
7	30.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-25	-
Chainage	2+033	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	273.59	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	16.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-25	1.20	22.00	19.50	18.00	471.62	207.00	14.39	3.60
BH-25	1.20	23.50	21.00	19.50	501.97	230.62	14.39	3.60
BH-25	1.20	25.00	22.50	21.00	532.32	254.24	14.81	3.70
BH-25	1.20	26.50	24.00	22.50	562.67	277.87	14.81	3.70
BH-25	1.20	28.00	25.50	24.00	653.68	303.00	15.22	3.81
BH-25	1.20	29.50	27.00	25.50	686.20	328.14	15.22	3.81
BH-25	1.20	30.00	27.50	26.00	697.04	336.52	15.63	3.91

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Coeff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.10	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	38.48	51.30	5.65	9.91	90.67	100.58	40.23	11.48
3	5.50	7.00	1.50	Granular	19.50	0.03	28	-	15.70	17.82	1.00	-	6.25	7.00	65.93	80.55	5.65	18.28	183.74	211.93	84.77	18.98
4	7.00	8.50	1.50	Granular	19.50	0.03	28	-	15.70	17.82	1.00	-	7.75	8.50	95.18	109.80	5.65	26.40	242.89	297.48	118.99	28.74
5	8.50	10.00	1.50	Granular	19.50	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	124.43	139.05	5.65	34.51	302.04	391.13	156.45	40.78
6	10.00	11.50	1.50	Granular	19.50	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	153.68	168.30	5.65	42.62	361.19	492.90	197.16	55.09
7	11.50	13.00	1.50	Granular	20.00	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	183.30	198.30	5.65	52.65	477.01	661.38	264.55	72.21
8	13.00	14.50	1.50	Granular	20.00	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	213.30	228.30	5.65	61.27	545.55	791.19	316.48	91.74
9	14.50	16.00	1.50	Granular	20.00	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	243.30	258.30	5.65	65.07	473.35	784.05	313.62	112.33
10	16.00	17.50	1.50	Granular	10.19	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	265.95	273.59	5.65	71.12	491.04	872.87	349.15	134.62
11	17.50	19.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	18.25	19.00	273.59	273.59	5.65	78.59	637.27	1097.69	439.08	159.00
12	19.00	20.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	19.75	20.50	273.59	273.59	5.65	78.59	637.27	1176.28	470.51	183.38
13	20.50	22.00	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	21.25	22.00	273.59	273.59	5.65	75.88	564.15	1179.04	471.62	207.00
14	22.00	23.50	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	22.75	23.50	273.59	273.59	5.65	75.88	564.15	1254.92	501.97	230.62
15	23.50	25.00	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	24.25	25.00	273.59	273.59	5.65	75.88	564.15	1330.80	532.32	254.24
16	25.00	26.50	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	25.75	26.50	273.59	273.59	5.65	75.88	564.15	1406.68	562.67	277.87
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	273.59	273.59	5.65	81.30	710.38	1634.20	653.68	303.00
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	273.59	273.59	5.65	81.30	710.38	1715.50	686.20	328.14
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	273.59	273.59	1.88	27.10	710.38	1742.60	697.04	336.52

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
7	30.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-26	-
Chainage	3+122	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	186.19	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	11.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-26	1.00	22.00	19.50	18.00	295.95	137.12	8.99	2.25
BH-26	1.00	23.50	21.00	19.50	314.63	151.68	9.36	2.34
BH-26	1.00	25.00	22.50	21.00	333.08	166.24	10.06	2.51
BH-26	1.00	26.50	24.00	22.50	351.52	180.80	10.40	2.60
BH-26	1.00	28.00	25.50	24.00	369.96	195.35	10.73	2.68
BH-26	1.00	29.50	27.00	25.50	388.40	209.91	10.73	2.68
BH-26	1.00	30.00	27.50	26.00	394.55	214.77	11.06	2.77

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.55	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.16	26.33	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.55	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.49	52.65	4.71	7.50	40.19	47.69	19.07	8.15
3	5.50	7.00	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	65.81	78.98	4.71	13.04	66.43	86.96	34.78	13.45
4	7.00	8.50	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	92.14	105.30	4.71	18.25	86.72	125.51	50.20	20.21
5	8.50	10.00	1.50	Granular	17.55	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	118.46	131.63	4.71	27.38	195.70	261.87	104.75	29.52
6	10.00	11.50	1.50	Granular	17.55	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	144.79	157.95	4.71	33.46	232.67	332.30	132.92	40.54
7	11.50	13.00	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	12.25	13.00	165.01	172.07	4.71	39.50	279.53	418.65	167.46	53.25
8	13.00	14.50	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	13.75	14.50	179.13	186.19	4.71	42.88	301.93	483.93	193.57	66.91
9	14.50	16.00	1.50	Granular	9.41	0.09	27	-	13.80	15.50	1.00	-	15.25	16.00	186.19	186.19	4.71	41.50	232.66	456.16	182.46	80.17
10	16.00	17.50	1.50	Granular	9.41	0.09	27	-	13.80	15.50	1.00	-	16.75	17.50	186.19	186.19	4.71	41.50	232.66	497.65	199.06	93.44
11	17.50	19.00	1.50	Granular	9.41	0.10	30	-	19.50	22.44	1.00	-	18.25	19.00	186.19	186.19	4.71	46.11	336.56	647.67	259.07	108.00
12	19.00	20.50	1.50	Granular	9.41	0.10	30	-	19.50	22.44	1.00	-	19.75	20.50	186.19	186.19	4.71	46.11	336.56	693.77	277.51	122.56
13	20.50	22.00	1.50	Granular	9.41	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	186.19	186.19	4.71	46.11	336.56	739.88	295.95	137.12
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	186.19	186.19	4.71	46.11	337.16	786.58	314.63	151.68
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	186.19	186.19	4.71	46.11	337.16	832.69	333.08	166.24
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	186.19	186.19	4.71	46.11	337.16	878.80	351.52	180.80
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	186.19	186.19	4.71	46.11	337.16	924.90	369.96	195.35
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	186.19	186.19	4.71	46.11	337.16	971.01	388.40	209.91
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	186.19	186.19	1.57	15.37	337.16	986.38	394.55	214.77

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.10	2.00	1.83	7.30	6.67	0.222	0.889	8.99	2.25	32.83	14.99	21.59	5.40	78.79	35.98
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.11	2.00	1.83	7.20	6.58	0.214	0.855	9.36	2.34	33.70	15.40	22.46	5.61	80.89	36.95
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
5	27.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-26	-
Chainage	3+122	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	214.43	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	11.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-26	1.20	22.00	19.50	18.00	430.15	179.51	11.71	2.93
BH-26	1.20	23.50	21.00	19.50	456.05	199.73	12.18	3.05
BH-26	1.20	25.00	22.50	21.00	481.54	219.94	13.09	3.27
BH-26	1.20	26.50	24.00	22.50	507.02	240.16	13.53	3.38
BH-26	1.20	28.00	25.50	24.00	532.51	260.38	13.97	3.49
BH-26	1.20	29.50	27.00	25.50	558.00	280.59	13.97	3.49
BH-26	1.20	30.00	27.50	26.00	566.50	287.33	14.39	3.60

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.55	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.16	26.33	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.55	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.49	52.65	5.65	9.00	59.07	68.06	27.23	11.23
3	5.50	7.00	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	65.81	78.98	5.65	15.65	97.25	121.89	48.76	17.98
4	7.00	8.50	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	92.14	105.30	5.65	21.90	126.48	173.02	69.21	26.49
5	8.50	10.00	1.50	Granular	17.55	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	118.46	131.63	5.65	32.85	284.94	364.34	145.73	38.07
6	10.00	11.50	1.50	Granular	17.55	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	144.79	157.95	5.65	40.16	338.17	457.73	183.09	51.68
7	11.50	13.00	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	12.25	13.00	165.01	172.07	5.65	47.40	404.40	571.35	228.54	67.33
8	13.00	14.50	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	13.75	14.50	179.13	186.19	5.65	51.45	436.66	655.07	262.03	84.11
9	14.50	16.00	1.50	Granular	9.41	0.09	27	-	13.80	15.50	1.00	-	15.25	16.00	193.25	200.31	5.65	51.68	361.35	631.44	252.58	100.96
10	16.00	17.50	1.50	Granular	9.41	0.09	27	-	13.80	15.50	1.00	-	16.75	17.50	207.37	214.43	5.65	55.46	386.20	711.75	284.70	118.86
11	17.50	19.00	1.50	Granular	9.41	0.10	30	-	19.50	22.44	1.00	-	18.25	19.00	214.43	214.43	5.65	63.72	558.66	947.93	379.17	139.08
12	19.00	20.50	1.50	Granular	9.41	0.10	30	-	19.50	22.44	1.00	-	19.75	20.50	214.43	214.43	5.65	63.72	558.66	1011.65	404.66	159.30
13	20.50	22.00	1.50	Granular	9.41	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	214.43	214.43	5.65	63.72	558.66	1075.37	430.15	179.51
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	214.43	214.43	5.65	63.72	559.70	1140.12	456.05	199.73
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	214.43	214.43	5.65	63.72	559.70	1203.84	481.54	219.94
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	214.43	214.43	5.65	63.72	559.70	1267.56	507.02	240.16
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	214.43	214.43	5.65	63.72	559.70	1331.28	532.51	260.38
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	214.43	214.43	5.65	63.72	559.70	1395.00	558.00	280.59
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	214.43	214.43	1.88	21.24	559.70	1416.24	566.50	287.33

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.95	2.02	1.84	8.52	7.74	0.171	0.683	11.71	2.93	49.92	22.66	28.11	7.03	119.81	54.38
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.96	2.02	1.84	8.41	7.64	0.164	0.657	12.18	3.05	51.25	23.27	29.24	7.31	122.99	55.85
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
5	27.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-27	-
Chainage	3+205	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	207.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	14.30	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-27	1.00	22.00	19.50	19.50	329.55	149.82	10.74	2.68
BH-27	1.00	23.50	21.00	21.00	350.12	165.87	11.02	2.76
BH-27	1.00	25.00	22.50	22.50	370.69	181.92	11.02	2.76
BH-27	1.00	26.50	24.00	24.00	391.26	197.97	11.30	2.83
BH-27	1.00	28.00	25.50	25.50	411.84	214.02	11.30	2.83
BH-27	1.00	29.50	27.00	27.00	432.41	230.07	11.30	2.83
BH-27	1.00	30.00	27.50	27.50	439.27	235.42	11.58	2.89

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.97	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	12.73	25.46	4.71	2.73	34.43	37.16	14.86	5.16
2	4.00	5.50	1.50	Granular	16.97	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	38.18	50.91	4.71	8.19	60.90	71.82	28.73	9.11
3	5.50	7.00	1.50	Granular	16.97	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	63.64	76.37	4.71	13.13	72.18	96.24	38.49	14.43
4	7.00	8.50	1.50	Granular	19.12	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	90.71	105.05	4.71	18.72	97.62	140.40	56.16	21.32
5	8.50	10.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	119.39	133.73	4.71	27.59	199.62	269.99	108.00	30.70
6	10.00	11.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	148.07	162.41	4.71	34.22	239.90	344.48	137.79	41.93
7	11.50	13.00	1.50	Granular	20.00	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	177.41	192.41	4.71	42.47	319.13	466.19	186.47	55.47
8	13.00	14.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	200.05	207.70	4.71	47.89	336.59	531.53	212.61	70.53
9	14.50	16.00	1.50	Granular	10.19	0.11	29	-	17.60	20.13	1.00	-	15.25	16.00	207.70	207.70	4.71	49.72	336.59	581.25	232.50	86.10
10	16.00	17.50	1.50	Granular	10.19	0.11	29	-	17.60	20.13	1.00	-	16.75	17.50	207.70	207.70	4.71	49.72	336.59	630.96	252.38	101.67
11	17.50	19.00	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	18.25	19.00	207.70	207.70	4.71	51.43	375.20	721.01	288.40	117.72
12	19.00	20.50	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	19.75	20.50	207.70	207.70	4.71	51.43	375.20	772.44	308.98	133.77
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	207.70	207.70	4.71	51.43	375.20	823.87	329.55	149.82
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	207.70	207.70	4.71	51.43	375.20	875.30	350.12	165.87
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	207.70	207.70	4.71	51.43	375.20	926.73	370.69	181.92
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	207.70	207.70	4.71	51.43	375.20	978.16	391.26	197.97
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	207.70	207.70	4.71	51.43	375.20	1029.59	411.84	214.02
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	207.70	207.70	4.71	51.43	375.20	1081.02	432.41	230.07
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	207.70	207.70	1.57	17.14	375.20	1098.17	439.27	235.42

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
2	22.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
3	24.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
4	25.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
5	27.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	30.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-27	-
Chainage	3+205	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	238.28	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	14.30	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-27	1.20	22.00	19.50	19.50	477.95	195.68	14.06	3.51
BH-27	1.20	23.50	21.00	21.00	506.27	217.88	14.43	3.61
BH-27	1.20	25.00	22.50	22.50	534.60	240.08	14.43	3.61
BH-27	1.20	26.50	24.00	24.00	562.92	262.28	14.79	3.70
BH-27	1.20	28.00	25.50	25.50	591.24	284.48	14.79	3.70
BH-27	1.20	29.50	27.00	27.00	619.56	306.68	14.79	3.70
BH-27	1.20	30.00	27.50	27.50	629.00	314.08	15.15	3.79

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.97	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	12.73	25.46	5.65	3.28	51.87	55.15	22.06	7.25
2	4.00	5.50	1.50	Granular	16.97	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	38.18	50.91	5.65	9.83	89.98	103.09	41.24	12.38
3	5.50	7.00	1.50	Granular	16.97	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	63.64	76.37	5.65	15.76	105.86	134.73	53.89	19.17
4	7.00	8.50	1.50	Granular	19.12	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	90.71	105.05	5.65	22.46	142.74	194.07	77.63	27.83
5	8.50	10.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	119.39	133.73	5.65	33.11	290.86	375.30	150.12	39.48
6	10.00	11.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	148.07	162.41	5.65	41.06	348.86	474.36	189.75	53.35
7	11.50	13.00	1.50	Granular	20.00	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	177.41	192.41	5.65	50.96	463.54	640.01	256.00	69.99
8	13.00	14.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	200.05	207.70	5.65	57.46	486.72	720.65	288.26	88.46
9	14.50	16.00	1.50	Granular	10.19	0.11	29	-	17.60	20.13	1.00	-	15.25	16.00	215.34	222.99	5.65	61.86	521.65	817.44	326.98	108.15
10	16.00	17.50	1.50	Granular	10.19	0.11	29	-	17.60	20.13	1.00	-	16.75	17.50	230.63	238.28	5.65	66.25	556.59	918.62	367.45	129.08
11	17.50	19.00	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	18.25	19.00	238.28	238.28	5.65	70.80	620.43	1053.27	421.31	151.28
12	19.00	20.50	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	19.75	20.50	238.28	238.28	5.65	70.80	620.43	1124.08	449.63	173.48
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	238.28	238.28	5.65	70.80	620.43	1194.88	477.95	195.68
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	238.28	238.28	5.65	70.80	620.43	1265.68	506.27	217.88
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	238.28	238.28	5.65	70.80	620.43	1336.49	534.60	240.08
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	238.28	238.28	5.65	70.80	620.43	1407.29	562.92	262.28
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	238.28	238.28	5.65	70.80	620.43	1478.10	591.24	284.48
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	238.28	238.28	5.65	70.80	620.43	1548.90	619.56	306.68
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	238.28	238.28	1.88	23.60	620.43	1572.50	629.00	314.08

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
2	22.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
3	24.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
4	25.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
5	27.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	30.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-28	-
Chainage	3+304	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	198.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-28	1.00	22.00	19.50	15.00	296.63	131.43	10.07	2.52
BH-28	1.00	23.50	21.00	16.50	316.27	146.83	10.48	2.62
BH-28	1.00	25.00	22.50	18.00	335.91	162.23	10.48	2.62
BH-28	1.00	26.50	24.00	19.50	355.55	177.62	10.48	2.62
BH-28	1.00	28.00	25.50	21.00	375.19	193.02	10.48	2.62
BH-28	1.00	29.50	27.00	22.50	394.83	208.42	10.48	2.62
BH-28	1.00	30.00	27.50	23.00	401.38	213.55	10.87	2.72

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.97	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.73	25.46	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.97	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.18	50.91	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	16.97	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	63.64	76.37	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	89.53	102.69	4.71	17.74	84.71	102.45	40.98	14.31
5	8.50	10.00	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	115.85	129.02	4.71	24.86	142.38	184.98	73.99	22.92
6	10.00	11.50	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	142.18	155.34	4.71	30.51	169.76	242.87	97.15	33.12
7	11.50	13.00	1.50	Granular	19.22	0.03	26	-	11.90	13.19	1.00	-	12.25	13.00	169.76	184.17	4.71	36.43	200.52	310.06	124.02	44.97
8	13.00	14.50	1.50	Granular	9.41	0.03	26	-	11.90	13.19	1.00	-	13.75	14.50	191.23	198.29	4.71	41.04	210.60	361.19	144.47	58.11
9	14.50	16.00	1.50	Granular	9.41	0.12	27	-	13.80	15.50	1.00	-	15.25	16.00	198.29	198.29	4.71	44.19	247.44	442.22	176.89	72.13
10	16.00	17.50	1.50	Granular	9.41	0.12	27	-	13.80	15.50	1.00	-	16.75	17.50	198.29	198.29	4.71	44.19	247.44	486.41	194.56	86.15
11	17.50	19.00	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	198.29	198.29	4.71	47.47	321.12	607.56	243.02	101.09
12	19.00	20.50	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	198.29	198.29	4.71	47.47	321.67	655.56	262.23	116.03
13	20.50	22.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	198.29	198.29	4.71	49.10	358.56	741.57	296.63	131.43
14	22.00	23.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	198.29	198.29	4.71	49.10	358.56	790.67	316.27	146.83
15	23.50	25.00	1.50	Granular	10.19	0.12	30	-	19.50	22.44	1.00	-	24.25	25.00	198.29	198.29	4.71	49.10	358.56	839.77	335.91	162.23
16	25.00	26.50	1.50	Granular	10.19	0.12	30	-	19.50	22.44	1.00	-	25.75	26.50	198.29	198.29	4.71	49.10	358.56	888.87	355.55	177.62
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	198.29	198.29	4.71	49.10	358.56	937.97	375.19	193.02
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	198.29	198.29	4.71	49.10	358.56	987.08	394.83	208.42
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	198.29	198.29	1.57	16.37	358.56	1003.44	401.38	213.55

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
3	24.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
4	25.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
5	27.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
6	28.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
7	30.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.97	1.93	1.80	6.85	6.42	0.184	0.736	10.87	2.72	37.26	17.45	26.10	6.52	89.42	41.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-28	-
Chainage	3+304	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	226.53	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-28	1.20	22.00	19.50	15.00	432.91	172.53	13.10	3.27
BH-28	1.20	23.50	21.00	16.50	459.84	193.75	13.63	3.41
BH-28	1.20	25.00	22.50	18.00	486.77	214.98	13.63	3.41
BH-28	1.20	26.50	24.00	19.50	513.69	236.20	13.63	3.41
BH-28	1.20	28.00	25.50	21.00	540.62	257.42	13.63	3.41
BH-28	1.20	29.50	27.00	22.50	567.54	278.64	13.63	3.41
BH-28	1.20	30.00	27.50	23.00	576.52	285.72	14.14	3.54

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.97	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.73	25.46	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.97	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.18	50.91	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	16.97	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	63.64	76.37	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.55	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	89.53	102.69	5.65	21.28	123.58	144.86	57.94	19.42
5	8.50	10.00	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	115.85	129.02	5.65	29.84	207.40	258.52	103.41	30.15
6	10.00	11.50	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	142.18	155.34	5.65	36.62	246.82	334.56	133.82	42.77
7	11.50	13.00	1.50	Granular	19.22	0.03	26	-	11.90	13.19	1.00	-	12.25	13.00	169.76	184.17	5.65	43.72	291.34	422.80	169.12	57.39
8	13.00	14.50	1.50	Granular	9.41	0.03	26	-	11.90	13.19	1.00	-	13.75	14.50	191.23	198.29	5.65	49.25	304.54	485.24	194.10	73.55
9	14.50	16.00	1.50	Granular	9.41	0.12	27	-	13.80	15.50	1.00	-	15.25	16.00	205.35	212.41	5.65	54.92	382.64	618.26	247.30	91.31
10	16.00	17.50	1.50	Granular	9.41	0.12	27	-	13.80	15.50	1.00	-	16.75	17.50	219.47	226.53	5.65	58.69	407.49	701.80	280.72	110.12
11	17.50	19.00	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	226.53	226.53	5.65	65.07	528.82	888.20	355.28	130.71
12	19.00	20.50	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	226.53	226.53	5.65	65.07	529.75	954.21	381.68	151.31
13	20.50	22.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	226.53	226.53	5.65	67.31	590.52	1082.29	432.91	172.53
14	22.00	23.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	226.53	226.53	5.65	67.31	590.52	1149.60	459.84	193.75
15	23.50	25.00	1.50	Granular	10.19	0.12	30	-	19.50	22.44	1.00	-	24.25	25.00	226.53	226.53	5.65	67.31	590.52	1216.92	486.77	214.98
16	25.00	26.50	1.50	Granular	10.19	0.12	30	-	19.50	22.44	1.00	-	25.75	26.50	226.53	226.53	5.65	67.31	590.52	1284.23	513.69	236.20
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	226.53	226.53	5.65	67.31	590.52	1351.54	540.62	257.42
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	226.53	226.53	5.65	67.31	590.52	1418.86	567.54	278.64
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	226.53	226.53	1.88	22.44	590.52	1441.30	576.52	285.72

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
3	24.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
4	25.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
5	27.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
6	28.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
7	30.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.70	1.95	1.81	8.01	7.45	0.141	0.566	14.14	3.54	56.61	26.35	33.94	8.49	135.86	63.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-28A	-
Chainage	3+367	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	215.64	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	15.70	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-28A	1.00	22.00	19.50	19.50	329.14	145.70	8.28	2.07
BH-28A	1.00	23.50	21.00	21.00	350.50	162.30	8.28	2.07
BH-28A	1.00	25.00	22.50	22.50	371.86	178.91	8.61	2.15
BH-28A	1.00	26.50	24.00	24.00	393.22	195.51	8.61	2.15
BH-28A	1.00	28.00	25.50	25.50	414.58	212.11	8.61	2.15
BH-28A	1.00	29.50	27.00	27.00	435.94	228.71	8.61	2.15
BH-28A	1.00	30.00	27.50	27.50	443.05	234.24	8.61	2.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	13.46	26.93	4.71	2.89	36.42	39.30	15.72	5.21
2	4.00	5.50	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	40.39	53.85	4.71	8.67	64.41	75.97	30.39	9.28
3	5.50	7.00	1.50	Granular	17.55	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	67.01	80.18	4.71	14.38	91.60	117.54	47.01	14.96
4	7.00	8.50	1.50	Granular	17.55	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	93.34	106.50	4.71	20.03	118.97	164.94	65.98	22.22
5	8.50	10.00	1.50	Granular	17.55	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	119.66	132.83	4.71	24.69	120.83	191.49	76.60	30.78
6	10.00	11.50	1.50	Granular	17.55	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	145.99	159.15	4.71	30.13	143.40	244.19	97.68	40.87
7	11.50	13.00	1.50	Granular	18.83	0.03	26	-	11.90	13.19	1.00	-	12.25	13.00	173.27	187.40	4.71	37.19	203.69	341.66	136.67	52.93
8	13.00	14.50	1.50	Granular	18.83	0.03	26	-	11.90	13.19	1.00	-	13.75	14.50	201.52	215.64	4.71	43.25	233.06	414.28	165.71	66.69
9	14.50	16.00	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	215.64	215.64	4.71	48.06	268.43	497.72	199.09	81.79
10	16.00	17.50	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	215.64	215.64	4.71	48.06	268.43	545.77	218.31	96.90
11	17.50	19.00	1.50	Granular	9.02	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	215.64	215.64	4.71	51.62	348.38	677.34	270.94	113.00
12	19.00	20.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	215.64	215.64	4.71	51.62	348.85	729.42	291.77	129.10
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	215.64	215.64	4.71	53.40	388.87	822.84	329.14	145.70
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	215.64	215.64	4.71	53.40	388.87	876.24	350.50	162.30
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	215.64	215.64	4.71	53.40	388.87	929.64	371.86	178.91
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	215.64	215.64	4.71	53.40	388.87	983.04	393.22	195.51
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	215.64	215.64	4.71	53.40	388.87	1036.44	414.58	212.11
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	215.64	215.64	4.71	53.40	388.87	1089.84	435.94	228.71
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	215.64	215.64	1.57	17.80	388.87	1107.64	443.05	234.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
2	22.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
3	24.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
4	25.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
5	27.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
6	28.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	30.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-28A	-
Chainage	3+367	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	242.71	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	15.70	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-28A	1.20	22.00	19.50	19.50	473.07	189.28	10.85	2.71
BH-28A	1.20	23.50	21.00	21.00	501.92	211.85	10.85	2.71
BH-28A	1.20	25.00	22.50	22.50	530.77	234.42	11.28	2.82
BH-28A	1.20	26.50	24.00	24.00	559.62	256.99	11.28	2.82
BH-28A	1.20	28.00	25.50	25.50	588.46	279.56	11.28	2.82
BH-28A	1.20	29.50	27.00	27.00	617.31	302.13	11.28	2.82
BH-28A	1.20	30.00	27.50	27.50	626.93	309.65	11.28	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Coeff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	13.46	26.93	5.65	3.47	54.86	58.33	23.33	7.30
2	4.00	5.50	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	40.39	53.85	5.65	10.40	95.18	109.05	43.62	12.59
3	5.50	7.00	1.50	Granular	17.55	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	67.01	80.18	5.65	17.26	134.27	165.40	66.16	19.80
4	7.00	8.50	1.50	Granular	17.55	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	93.34	106.50	5.65	24.04	173.69	228.85	91.54	28.90
5	8.50	10.00	1.50	Granular	17.55	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	119.66	132.83	5.65	29.63	175.98	260.78	104.31	39.58
6	10.00	11.50	1.50	Granular	17.55	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	145.99	159.15	5.65	36.15	208.49	329.44	131.77	52.07
7	11.50	13.00	1.50	Granular	18.83	0.03	26	-	11.90	13.19	1.00	-	12.25	13.00	173.27	187.40	5.65	44.62	295.86	461.43	184.57	66.94
8	13.00	14.50	1.50	Granular	18.83	0.03	26	-	11.90	13.19	1.00	-	13.75	14.50	201.52	215.64	5.65	51.90	338.15	555.62	222.25	83.85
9	14.50	16.00	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	222.41	229.18	5.65	59.48	411.78	688.72	275.49	102.88
10	16.00	17.50	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	235.94	242.71	5.65	63.10	435.60	775.64	310.26	122.92
11	17.50	19.00	1.50	Granular	9.02	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	242.71	242.71	5.65	69.72	565.32	975.08	390.03	144.82
12	19.00	20.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	242.71	242.71	5.65	69.72	566.12	1045.60	418.24	166.71
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	242.71	242.71	5.65	72.12	631.07	1182.67	473.07	189.28
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	242.71	242.71	5.65	72.12	631.07	1254.79	501.92	211.85
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	242.71	242.71	5.65	72.12	631.07	1326.92	530.77	234.42
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	242.71	242.71	5.65	72.12	631.07	1399.04	559.62	256.99
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	242.71	242.71	5.65	72.12	631.07	1471.16	588.46	279.56
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	242.71	242.71	5.65	72.12	631.07	1543.28	617.31	302.13
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	242.71	242.71	1.88	24.04	631.07	1567.32	626.93	309.65

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
2	22.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
3	24.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
4	25.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
5	27.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
6	28.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	30.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-29	-
Chainage	3+391	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	222.38	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	14.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-29	1.00	22.00	19.50	19.50	343.58	152.48	8.93	2.23
BH-29	1.00	23.50	21.00	21.00	365.61	169.55	8.93	2.23
BH-29	1.00	25.00	22.50	22.50	387.64	186.62	8.93	2.23
BH-29	1.00	26.50	24.00	24.00	409.66	203.68	8.93	2.23
BH-29	1.00	28.00	25.50	25.50	431.69	220.75	8.93	2.23
BH-29	1.00	29.50	27.00	27.00	453.72	237.82	8.93	2.23
BH-29	1.00	30.00	27.50	27.50	461.06	243.51	8.93	2.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	3.25	4.00	13.16	26.33	4.71	2.82	35.60	38.43	15.37	5.19
2	4.00	5.50	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	4.75	5.50	39.49	52.65	4.71	8.47	62.98	74.28	29.71	9.21
3	5.50	7.00	1.50	Granular	17.55	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	65.81	78.98	4.71	14.12	90.35	115.77	46.31	14.82
4	7.00	8.50	1.50	Granular	19.12	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	93.32	107.66	4.71	20.03	120.91	166.36	66.54	22.07
5	8.50	10.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	122.00	136.34	4.71	28.20	203.29	276.93	110.77	31.62
6	10.00	11.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	150.68	165.02	4.71	34.82	243.56	352.03	140.81	43.02
7	11.50	13.00	1.50	Granular	19.12	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	179.36	193.70	4.71	42.93	320.57	471.97	188.79	56.69
8	13.00	14.50	1.50	Granular	19.12	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	208.04	222.38	4.71	49.80	366.07	567.27	226.91	72.28
9	14.50	16.00	1.50	Granular	9.41	0.07	27	-	13.80	15.50	1.00	-	15.25	16.00	222.38	222.38	4.71	49.56	276.88	527.64	211.05	87.81
10	16.00	17.50	1.50	Granular	9.41	0.07	27	-	13.80	15.50	1.00	-	16.75	17.50	222.38	222.38	4.71	49.56	276.88	577.20	230.88	103.33
11	17.50	19.00	1.50	Granular	9.41	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	222.38	222.38	4.71	51.40	318.11	669.82	267.93	119.37
12	19.00	20.50	1.50	Granular	9.41	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	222.38	222.38	4.71	51.40	318.11	721.22	288.49	135.41
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	222.38	222.38	4.71	55.07	400.78	858.96	343.58	152.48
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	222.38	222.38	4.71	55.07	400.78	914.02	365.61	169.55
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	222.38	222.38	4.71	55.07	400.78	969.09	387.64	186.62
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	222.38	222.38	4.71	55.07	400.78	1024.16	409.66	203.68
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	222.38	222.38	4.71	55.07	400.78	1079.22	431.69	220.75
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	222.38	222.38	4.71	55.07	400.78	1134.29	453.72	237.82
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	222.38	222.38	1.57	18.36	400.78	1152.65	461.06	243.51

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
4	25.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
5	27.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
6	28.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
7	30.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-29	-
Chainage	3+391	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	250.62	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	14.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-29	1.20	22.00	19.50	19.50	493.05	197.63	11.70	2.93
BH-29	1.20	23.50	21.00	21.00	522.84	220.86	11.70	2.93
BH-29	1.20	25.00	22.50	22.50	552.63	244.09	11.70	2.93
BH-29	1.20	26.50	24.00	24.00	582.41	267.31	11.70	2.93
BH-29	1.20	28.00	25.50	25.50	612.20	290.54	11.70	2.93
BH-29	1.20	29.50	27.00	27.00	641.99	313.77	11.70	2.93
BH-29	1.20	30.00	27.50	27.50	651.92	321.51	11.70	2.93

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	3.25	4.00	13.16	26.33	5.65	3.39	53.64	57.03	22.81	7.28
2	4.00	5.50	1.50	Granular	17.55	0.03	26	-	11.90	13.19	1.00	-	4.75	5.50	39.49	52.65	5.65	10.17	93.06	106.62	42.65	12.51
3	5.50	7.00	1.50	Granular	17.55	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	65.81	78.98	5.65	16.95	132.48	162.98	65.19	19.63
4	7.00	8.50	1.50	Granular	19.12	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	93.32	107.66	5.65	24.03	176.69	231.23	92.49	28.73
5	8.50	10.00	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	122.00	136.34	5.65	33.83	296.14	384.51	153.81	40.58
6	10.00	11.50	1.50	Granular	19.12	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	150.68	165.02	5.65	41.79	354.14	484.30	193.72	54.65
7	11.50	13.00	1.50	Granular	19.12	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	179.36	193.70	5.65	51.52	465.44	647.12	258.85	71.45
8	13.00	14.50	1.50	Granular	19.12	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	208.04	222.38	5.65	59.76	530.96	772.40	308.96	90.56
9	14.50	16.00	1.50	Granular	9.41	0.07	27	-	13.80	15.50	1.00	-	15.25	16.00	229.44	236.50	5.65	61.36	425.02	727.82	291.13	110.12
10	16.00	17.50	1.50	Granular	9.41	0.07	27	-	13.80	15.50	1.00	-	16.75	17.50	243.56	250.62	5.65	65.14	449.87	817.81	327.12	130.73
11	17.50	19.00	1.50	Granular	9.41	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	250.62	250.62	5.65	69.51	516.86	954.30	381.72	152.57
12	19.00	20.50	1.50	Granular	9.41	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	250.62	250.62	5.65	69.51	516.86	1023.81	409.52	174.40
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	250.62	250.62	5.65	74.47	651.20	1232.62	493.05	197.63
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	250.62	250.62	5.65	74.47	651.20	1307.09	522.84	220.86
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	250.62	250.62	5.65	74.47	651.20	1381.56	552.63	244.09
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	250.62	250.62	5.65	74.47	651.20	1456.03	582.41	267.31
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	250.62	250.62	5.65	74.47	651.20	1530.51	612.20	290.54
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	250.62	250.62	5.65	74.47	651.20	1604.98	641.99	313.77
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	250.62	250.62	1.88	24.82	651.20	1629.80	651.92	321.51

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
4	25.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
5	27.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
6	28.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
7	30.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-30	-
Chainage	3+514	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	212.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	14.55	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-30	1.00	22.00	19.50	19.50	331.15	148.71	8.61	2.15
BH-30	1.00	23.50	21.00	21.00	352.18	165.09	8.61	2.15
BH-30	1.00	25.00	22.50	22.50	373.22	181.47	8.93	2.23
BH-30	1.00	26.50	24.00	24.00	394.26	197.84	8.93	2.23
BH-30	1.00	28.00	25.50	25.50	415.30	214.22	8.93	2.23
BH-30	1.00	29.50	27.00	27.00	436.34	230.59	8.93	2.23
BH-30	1.00	30.00	27.50	27.50	443.35	236.05	8.93	2.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	13.46	26.93	4.71	0.00	36.42	36.42	14.57	4.40
2	4.00	5.50	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	40.39	53.85	4.71	8.67	64.41	73.08	29.23	8.47
3	5.50	7.00	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	67.31	80.78	4.71	14.45	92.41	115.52	46.21	14.17
4	7.00	8.50	1.50	Granular	17.55	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	93.94	107.10	4.71	20.16	119.60	162.87	65.15	21.46
5	8.50	10.00	1.50	Granular	17.55	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	120.26	133.43	4.71	26.80	172.60	242.68	97.07	30.62
6	10.00	11.50	1.50	Granular	17.55	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	146.59	159.75	4.71	32.67	204.77	307.52	123.01	41.41
7	11.50	13.00	1.50	Granular	17.55	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	172.91	186.08	4.71	39.96	272.16	414.87	165.95	54.25
8	13.00	14.50	1.50	Granular	17.55	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	199.24	212.40	4.71	46.05	309.13	497.89	199.16	68.80
9	14.50	16.00	1.50	Granular	9.31	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	212.40	212.40	4.71	50.84	343.44	583.04	233.22	84.68
10	16.00	17.50	1.50	Granular	9.31	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	212.40	212.40	4.71	50.84	343.44	633.88	253.55	100.57
11	17.50	19.00	1.50	Granular	9.31	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	212.40	212.40	4.71	50.84	343.44	684.73	273.89	116.45
12	19.00	20.50	1.50	Granular	9.31	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	212.40	212.40	4.71	50.84	343.44	735.57	294.23	132.34
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	212.40	212.40	4.71	52.60	383.14	827.86	331.15	148.71
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	212.40	212.40	4.71	52.60	383.14	880.46	352.18	165.09
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	212.40	212.40	4.71	52.60	383.14	933.06	373.22	181.47
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	212.40	212.40	4.71	52.60	383.14	985.65	394.26	197.84
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	212.40	212.40	4.71	52.60	383.14	1038.25	415.30	214.22
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	212.40	212.40	4.71	52.60	383.14	1090.84	436.34	230.59
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	212.40	212.40	1.57	17.53	383.14	1108.38	443.35	236.05

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
4	25.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
5	27.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
6	28.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
7	30.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-30	-
Chainage	3+514	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	240.34	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	14.55	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-30	1.20	22.00	19.50	19.50	476.43	193.33	11.28	2.82
BH-30	1.20	23.50	21.00	21.00	505.00	215.70	11.28	2.82
BH-30	1.20	25.00	22.50	22.50	533.57	238.07	11.70	2.93
BH-30	1.20	26.50	24.00	24.00	562.13	260.44	11.70	2.93
BH-30	1.20	28.00	25.50	25.50	590.70	282.82	11.70	2.93
BH-30	1.20	29.50	27.00	27.00	619.27	305.19	11.70	2.93
BH-30	1.20	30.00	27.50	27.50	628.79	312.65	11.70	2.93

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	13.46	26.93	5.65	0.00	54.86	54.86	21.95	6.33
2	4.00	5.50	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	40.39	53.85	5.65	10.40	95.18	105.58	42.23	11.62
3	5.50	7.00	1.50	Granular	17.95	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	67.31	80.78	5.65	17.34	135.50	163.23	65.29	18.85
4	7.00	8.50	1.50	Granular	17.55	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	93.94	107.10	5.65	24.19	174.59	226.52	90.61	28.00
5	8.50	10.00	1.50	Granular	17.55	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	120.26	133.43	5.65	32.16	251.29	335.38	134.15	39.38
6	10.00	11.50	1.50	Granular	17.55	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	146.59	159.75	5.65	39.20	297.62	420.91	168.36	52.73
7	11.50	13.00	1.50	Granular	17.55	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	172.91	186.08	5.65	47.96	395.04	566.30	226.52	68.53
8	13.00	14.50	1.50	Granular	17.55	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	199.24	212.40	5.65	55.26	448.28	674.79	269.91	86.38
9	14.50	16.00	1.50	Granular	9.31	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	219.39	226.37	5.65	63.02	528.33	817.86	327.14	106.40
10	16.00	17.50	1.50	Granular	9.31	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	233.36	240.34	5.65	67.03	560.25	916.81	366.72	127.54
11	17.50	19.00	1.50	Granular	9.31	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	240.34	240.34	5.65	69.04	560.25	985.84	394.34	149.25
12	19.00	20.50	1.50	Granular	9.31	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	240.34	240.34	5.65	69.04	560.25	1054.88	421.95	170.96
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	240.34	240.34	5.65	71.42	625.03	1191.08	476.43	193.33
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	240.34	240.34	5.65	71.42	625.03	1262.50	505.00	215.70
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	240.34	240.34	5.65	71.42	625.03	1333.91	533.57	238.07
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	240.34	240.34	5.65	71.42	625.03	1405.33	562.13	260.44
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	240.34	240.34	5.65	71.42	625.03	1476.75	590.70	282.82
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	240.34	240.34	5.65	71.42	625.03	1548.17	619.27	305.19
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	240.34	240.34	1.88	23.81	625.03	1571.97	628.79	312.65

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
4	25.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
5	27.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
6	28.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
7	30.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-21	-
Chainage	2+605	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.92	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-21	1.00	22.00	19.50	16.50	148.04	76.80	10.73	2.68
BH-21	1.00	23.50	21.00	18.00	157.84	85.31	11.10	2.77
BH-21	1.00	25.00	22.50	19.50	167.64	93.82	11.45	2.86
BH-21	1.00	26.50	24.00	21.00	177.67	102.33	11.80	2.95
BH-21	1.00	28.00	25.50	22.50	187.47	110.83	12.15	3.04
BH-21	1.00	29.50	27.00	24.00	197.27	119.34	12.15	3.04
BH-21	1.00	30.00	27.50	24.50	200.54	122.18	12.49	3.12

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.74	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.81	11.62	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.74	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.42	23.23	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	29.04	34.85	4.71	0.00	29.31	29.31	11.72	7.70
4	7.00	8.50	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	40.65	46.46	4.71	8.05	38.26	46.32	18.53	11.60
5	8.50	10.00	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	52.27	58.08	4.71	11.22	64.02	83.29	33.32	16.39
6	10.00	11.50	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	63.88	69.69	4.71	13.71	76.10	109.08	43.63	21.88
7	11.50	13.00	1.50	Granular	9.74	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	77.00	84.31	4.71	17.80	124.42	175.19	70.08	28.51
8	13.00	14.50	1.50	Granular	9.74	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	91.61	98.92	4.71	21.17	144.94	216.89	86.76	36.09
9	14.50	16.00	1.50	Granular	9.74	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	98.92	98.92	4.71	22.05	126.19	220.18	88.07	43.91
10	16.00	17.50	1.50	Granular	9.41	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	98.92	98.92	4.71	22.05	126.01	242.05	96.82	51.73
11	17.50	19.00	1.50	Granular	9.41	0.04	29	-	17.60	20.13	1.00	-	18.25	19.00	98.92	98.92	4.71	23.68	163.47	303.19	121.28	60.01
12	19.00	20.50	1.50	Granular	9.41	0.04	29	-	17.60	20.13	1.00	-	19.75	20.50	98.92	98.92	4.71	23.68	163.47	326.87	130.75	68.29
13	20.50	22.00	1.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	98.92	98.92	4.71	24.50	182.20	370.10	148.04	76.80
14	22.00	23.50	1.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	98.92	98.92	4.71	24.50	182.20	394.59	157.84	85.31
15	23.50	25.00	1.50	Granular	9.41	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	98.92	98.92	4.71	24.50	182.20	419.09	167.64	93.82
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	98.92	98.92	4.71	24.50	182.80	444.18	177.67	102.33
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	98.92	98.92	4.71	24.50	182.80	468.68	187.47	110.83
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	98.92	98.92	4.71	24.50	182.80	493.17	197.27	119.34
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	98.92	98.92	1.57	8.17	182.80	501.34	200.54	122.18

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
2	22.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
3	24.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
6	28.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-21	-
Chainage	2+605	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	127.66	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-21	1.20	22.00	19.50	16.50	238.37	107.15	13.94	3.49
BH-21	1.20	23.50	21.00	18.00	253.54	120.15	14.41	3.60
BH-21	1.20	25.00	22.50	19.50	268.71	133.14	14.88	3.72
BH-21	1.20	26.50	24.00	21.00	284.30	146.14	15.33	3.83
BH-21	1.20	28.00	25.50	22.50	299.47	159.14	15.78	3.95
BH-21	1.20	29.50	27.00	24.00	314.65	172.13	15.78	3.95
BH-21	1.20	30.00	27.50	24.50	319.71	176.46	16.23	4.06

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.74	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.81	11.62	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.74	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.42	23.23	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	29.04	34.85	5.65	0.00	42.91	42.91	17.16	11.08
4	7.00	8.50	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	40.65	46.46	5.65	9.66	55.80	65.47	26.19	16.16
5	8.50	10.00	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	52.27	58.08	5.65	13.46	93.23	116.36	46.54	22.31
6	10.00	11.50	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	63.88	69.69	5.65	16.45	110.63	150.20	60.08	29.29
7	11.50	13.00	1.50	Granular	9.74	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	77.00	84.31	5.65	21.35	180.90	241.83	96.73	37.64
8	13.00	14.50	1.50	Granular	9.74	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	91.61	98.92	5.65	25.41	210.45	296.79	118.72	47.13
9	14.50	16.00	1.50	Granular	9.74	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	106.23	113.54	5.65	28.41	208.95	323.70	129.48	57.46
10	16.00	17.50	1.50	Granular	9.41	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	120.60	127.66	5.65	32.25	233.49	380.49	152.20	68.87
11	17.50	19.00	1.50	Granular	9.41	0.04	29	-	17.60	20.13	1.00	-	18.25	19.00	127.66	127.66	5.65	36.67	302.93	486.60	194.64	81.51
12	19.00	20.50	1.50	Granular	9.41	0.04	29	-	17.60	20.13	1.00	-	19.75	20.50	127.66	127.66	5.65	36.67	302.93	523.26	209.31	94.15
13	20.50	22.00	1.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	127.66	127.66	5.65	37.93	337.64	595.92	238.37	107.15
14	22.00	23.50	1.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	127.66	127.66	5.65	37.93	337.64	633.85	253.54	120.15
15	23.50	25.00	1.50	Granular	9.41	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	127.66	127.66	5.65	37.93	337.64	671.78	268.71	133.14
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	127.66	127.66	5.65	37.93	338.68	710.75	284.30	146.14
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	127.66	127.66	5.65	37.93	338.68	748.68	299.47	159.14
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	127.66	127.66	5.65	37.93	338.68	786.62	314.65	172.13
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	127.66	127.66	1.88	12.64	338.68	799.26	319.71	176.46

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
2	22.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
3	24.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
6	28.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-22	-
Chainage	2+719	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	111.33	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-22	1.00	22.00	19.50	16.50	152.74	85.77	9.98	2.50
BH-22	1.00	23.50	21.00	18.00	163.32	94.62	10.36	2.59
BH-22	1.00	25.00	22.50	19.50	191.19	103.99	10.73	2.68
BH-22	1.00	26.50	24.00	21.00	201.98	113.36	10.73	2.68
BH-22	1.00	28.00	25.50	22.50	204.24	122.47	11.10	2.77
BH-22	1.00	29.50	27.00	24.00	214.90	131.58	11.10	2.77
BH-22	1.00	30.00	27.50	24.50	226.97	134.71	11.45	2.86

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.31	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	6.99	13.97	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	9.31	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	20.96	27.94	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	9.31	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	34.93	41.91	4.71	7.50	47.95	55.44	22.18	9.80
4	7.00	8.50	1.50	Granular	9.31	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	48.90	55.88	4.71	10.49	62.47	80.46	32.18	14.38
5	8.50	10.00	1.50	Granular	9.31	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	62.87	69.85	4.71	13.49	77.00	108.48	43.39	19.81
6	10.00	11.50	1.50	Granular	9.31	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	76.84	83.82	4.71	16.49	91.53	139.50	55.80	26.08
7	11.50	13.00	1.50	Granular	9.31	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	90.81	97.79	4.71	20.99	143.09	212.05	84.82	33.60
8	13.00	14.50	1.50	Granular	9.02	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	104.56	111.33	4.71	24.17	161.92	255.04	102.02	42.02
9	14.50	16.00	1.50	Granular	9.02	0.06	27	-	13.80	15.50	1.00	-	15.25	16.00	111.33	111.33	4.71	24.81	140.95	258.89	103.55	50.61
10	16.00	17.50	1.50	Granular	9.02	0.06	27	-	13.80	15.50	1.00	-	16.75	17.50	111.33	111.33	4.71	24.81	140.95	283.70	113.48	59.21
11	17.50	19.00	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	18.25	19.00	111.33	111.33	4.71	25.73	161.92	330.39	132.16	68.06
12	19.00	20.50	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	19.75	20.50	111.33	111.33	4.71	25.73	161.92	356.12	142.45	76.92
13	20.50	22.00	1.50	Granular	9.02	0.07	28	-	15.70	17.82	1.00	-	21.25	22.00	111.33	111.33	4.71	25.73	161.92	381.85	152.74	85.77
14	22.00	23.50	1.50	Granular	10.19	0.07	28	-	15.70	17.82	1.00	-	22.75	23.50	111.33	111.33	4.71	25.73	162.64	408.30	163.32	94.62
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	111.33	111.33	4.71	27.57	204.74	477.97	191.19	103.99
16	25.00	26.50	1.50	Granular	9.41	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	111.33	111.33	4.71	27.57	204.14	504.94	201.98	113.36
17	26.50	28.00	1.50	Granular	9.41	0.12	29	-	17.60	20.13	1.00	-	27.25	28.00	111.33	111.33	4.71	26.65	183.15	510.60	204.24	122.47
18	28.00	29.50	1.50	Granular	9.41	0.12	29	-	17.60	20.13	1.00	-	28.75	29.50	111.33	111.33	4.71	26.65	183.15	537.24	214.90	131.58
19	29.50	30.00	0.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	111.33	111.33	1.57	9.19	204.14	567.43	226.97	134.71

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
6	28.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
7	30.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-22	-
Chainage	2+719	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	138.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-22	1.20	22.00	19.50	16.50	233.28	117.06	12.97	3.24
BH-22	1.20	23.50	21.00	18.00	249.13	130.19	13.46	3.36
BH-22	1.20	25.00	22.50	19.50	295.69	144.08	13.94	3.49
BH-22	1.20	26.50	24.00	21.00	311.73	157.97	13.94	3.49
BH-22	1.20	28.00	25.50	22.50	312.61	171.47	14.41	3.60
BH-22	1.20	29.50	27.00	24.00	328.51	184.98	14.41	3.60
BH-22	1.20	30.00	27.50	24.50	349.01	189.61	14.88	3.72

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.31	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	6.99	13.97	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	9.31	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	20.96	27.94	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	9.31	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	34.93	41.91	5.65	8.99	70.30	79.30	31.72	13.60
4	7.00	8.50	1.50	Granular	9.31	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	48.90	55.88	5.65	12.59	91.22	112.81	45.12	19.50
5	8.50	10.00	1.50	Granular	9.31	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	62.87	69.85	5.65	16.19	112.14	149.91	59.97	26.41
6	10.00	11.50	1.50	Granular	9.31	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	76.84	83.82	5.65	19.79	133.06	190.62	76.25	34.33
7	11.50	13.00	1.50	Granular	9.31	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	90.81	97.79	5.65	25.18	207.71	290.46	116.18	43.75
8	13.00	14.50	1.50	Granular	9.02	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	104.56	111.33	5.65	29.00	234.77	346.52	138.61	54.25
9	14.50	16.00	1.50	Granular	9.02	0.06	27	-	13.80	15.50	1.00	-	15.25	16.00	118.09	124.86	5.65	31.58	228.21	371.54	148.61	65.47
10	16.00	17.50	1.50	Granular	9.02	0.06	27	-	13.80	15.50	1.00	-	16.75	17.50	131.63	138.40	5.65	35.20	252.02	430.56	172.22	77.70
11	17.50	19.00	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	18.25	19.00	138.40	138.40	5.65	38.38	289.51	506.42	202.57	90.82
12	19.00	20.50	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	19.75	20.50	138.40	138.40	5.65	38.38	289.51	544.81	217.92	103.94
13	20.50	22.00	1.50	Granular	9.02	0.07	28	-	15.70	17.82	1.00	-	21.25	22.00	138.40	138.40	5.65	38.38	289.51	583.19	233.28	117.06
14	22.00	23.50	1.50	Granular	10.19	0.07	28	-	15.70	17.82	1.00	-	22.75	23.50	138.40	138.40	5.65	38.38	290.76	622.82	249.13	130.19
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	138.40	138.40	5.65	41.12	366.04	739.22	295.69	144.08
16	25.00	26.50	1.50	Granular	9.41	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	138.40	138.40	5.65	41.12	365.00	779.31	311.73	157.97
17	26.50	28.00	1.50	Granular	9.41	0.12	29	-	17.60	20.13	1.00	-	27.25	28.00	138.40	138.40	5.65	39.75	327.46	781.53	312.61	171.47
18	28.00	29.50	1.50	Granular	9.41	0.12	29	-	17.60	20.13	1.00	-	28.75	29.50	138.40	138.40	5.65	39.75	327.46	821.28	328.51	184.98
19	29.50	30.00	0.50	Granular	9.41	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	138.40	138.40	1.88	13.71	365.00	872.53	349.01	189.61

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
6	28.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
7	30.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-23	-
Chainage	2+823	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.88	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-23	1.00	22.00	19.50	16.50	151.63	81.99	9.98	2.50
BH-23	1.00	23.50	21.00	18.00	161.76	90.67	9.98	2.50
BH-23	1.00	25.00	22.50	19.50	180.07	99.59	10.36	2.59
BH-23	1.00	26.50	24.00	21.00	190.37	108.51	10.73	2.68
BH-23	1.00	28.00	25.50	22.50	200.76	117.43	11.10	2.77
BH-23	1.00	29.50	27.00	24.00	211.14	126.36	11.45	2.86
BH-23	1.00	30.00	27.50	24.50	214.61	129.33	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.16	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.37	10.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.16	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.12	21.49	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	9.31	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	28.48	35.46	4.71	5.88	34.08	39.96	15.98	9.34
4	7.00	8.50	1.50	Granular	9.31	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	42.45	49.43	4.71	8.76	46.06	60.70	24.28	13.44
5	8.50	10.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	56.42	63.40	4.71	13.04	94.80	122.47	48.99	18.74
6	10.00	11.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	70.39	77.37	4.71	16.27	114.41	158.35	63.34	24.95
7	11.50	13.00	1.50	Granular	9.31	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	84.36	91.34	4.71	19.50	134.03	197.47	78.99	32.06
8	13.00	14.50	1.50	Granular	9.02	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	98.11	104.88	4.71	22.67	152.86	238.97	95.59	40.05
9	14.50	16.00	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	104.88	104.88	4.71	23.37	133.07	242.56	97.02	48.25
10	16.00	17.50	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	104.88	104.88	4.71	23.37	133.07	265.93	106.37	56.44
11	17.50	19.00	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	18.25	19.00	104.88	104.88	4.71	24.24	152.86	309.96	123.98	64.88
12	19.00	20.50	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	19.75	20.50	104.88	104.88	4.71	24.24	152.86	334.20	133.68	73.31
13	20.50	22.00	1.50	Granular	9.02	0.00	29	-	17.60	20.13	1.00	-	21.25	22.00	104.88	104.88	4.71	25.10	172.65	379.09	151.63	81.99
14	22.00	23.50	1.50	Granular	9.31	0.00	29	-	17.60	20.13	1.00	-	22.75	23.50	104.88	104.88	4.71	25.10	172.85	404.39	161.76	90.67
15	23.50	25.00	1.50	Granular	9.31	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	104.88	104.88	4.71	25.97	192.66	450.17	180.07	99.59
16	25.00	26.50	1.50	Granular	9.02	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	104.88	104.88	4.71	25.97	192.44	475.92	190.37	108.51
17	26.50	28.00	1.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	104.88	104.88	4.71	25.97	192.44	501.89	200.76	117.43
18	28.00	29.50	1.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	104.88	104.88	4.71	25.97	192.44	527.86	211.14	126.36
19	29.50	30.00	0.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	104.88	104.88	1.57	8.66	192.44	536.52	214.61	129.33

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-23	-
Chainage	2+823	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	131.95	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-23	1.20	22.00	19.50	16.50	236.01	112.61	12.97	3.24
BH-23	1.20	23.50	21.00	18.00	251.31	125.59	12.97	3.24
BH-23	1.20	25.00	22.50	19.50	281.32	138.95	13.46	3.36
BH-23	1.20	26.50	24.00	21.00	296.85	152.30	13.94	3.49
BH-23	1.20	28.00	25.50	22.50	312.53	165.65	14.41	3.60
BH-23	1.20	29.50	27.00	24.00	328.22	179.01	14.88	3.72
BH-23	1.20	30.00	27.50	24.50	333.45	183.46	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.16	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.37	10.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.16	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.12	21.49	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	9.31	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	28.48	35.46	5.65	7.05	50.13	57.18	22.87	13.06
4	7.00	8.50	1.50	Granular	9.31	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	42.45	49.43	5.65	10.51	67.39	84.95	33.98	18.38
5	8.50	10.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	56.42	63.40	5.65	15.65	138.17	171.37	68.55	25.13
6	10.00	11.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	70.39	77.37	5.65	19.52	166.42	219.14	87.66	32.97
7	11.50	13.00	1.50	Granular	9.31	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	84.36	91.34	5.65	23.40	194.67	270.79	108.32	41.90
8	13.00	14.50	1.50	Granular	9.02	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	98.11	104.88	5.65	27.21	221.73	325.06	130.02	51.89
9	14.50	16.00	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	111.64	118.41	5.65	29.86	216.86	350.05	140.02	62.63
10	16.00	17.50	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	125.18	131.95	5.65	33.48	240.67	407.34	162.94	74.38
11	17.50	19.00	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	18.25	19.00	131.95	131.95	5.65	36.59	276.47	479.73	191.89	87.00
12	19.00	20.50	1.50	Granular	9.02	0.06	28	-	15.70	17.82	1.00	-	19.75	20.50	131.95	131.95	5.65	36.59	276.47	516.32	206.53	99.62
13	20.50	22.00	1.50	Granular	9.02	0.00	29	-	17.60	20.13	1.00	-	21.25	22.00	131.95	131.95	5.65	37.90	312.26	590.02	236.01	112.61
14	22.00	23.50	1.50	Granular	9.31	0.00	29	-	17.60	20.13	1.00	-	22.75	23.50	131.95	131.95	5.65	37.90	312.61	628.27	251.31	125.59
15	23.50	25.00	1.50	Granular	9.31	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	131.95	131.95	5.65	39.21	348.44	703.31	281.32	138.95
16	25.00	26.50	1.50	Granular	9.02	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	131.95	131.95	5.65	39.21	348.05	742.13	296.85	152.30
17	26.50	28.00	1.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	131.95	131.95	5.65	39.21	348.05	781.34	312.53	165.65
18	28.00	29.50	1.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	131.95	131.95	5.65	39.21	348.05	820.54	328.22	179.01
19	29.50	30.00	0.50	Granular	9.02	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	131.95	131.95	1.88	13.07	348.05	833.61	333.45	183.46

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-24	-
Chainage	2+920	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.74	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-24	1.00	22.00	19.50	19.50	166.14	86.42	10.16	2.54
BH-24	1.00	23.50	21.00	21.00	176.52	95.33	10.16	2.54
BH-24	1.00	25.00	22.50	22.50	186.89	104.25	10.16	2.54
BH-24	1.00	26.50	24.00	24.00	197.27	113.16	10.16	2.54
BH-24	1.00	28.00	25.50	25.50	207.64	122.07	10.45	2.61
BH-24	1.00	29.50	27.00	27.00	218.02	130.98	10.45	2.61
BH-24	1.00	30.00	27.50	27.50	221.47	133.95	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	6.11	12.22	4.71	1.31	16.52	17.83	7.13	4.77
2	4.00	5.50	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	18.32	24.43	4.71	3.93	29.22	34.47	13.79	7.52
3	5.50	7.00	1.50	Granular	8.14	0.01	27	-	13.80	15.50	1.00	-	6.25	7.00	30.54	36.65	4.71	6.81	49.21	61.26	24.50	11.07
4	7.00	8.50	1.50	Granular	8.14	0.01	27	-	13.80	15.50	1.00	-	7.75	8.50	42.75	48.86	4.71	9.53	64.14	85.72	34.29	15.39
5	8.50	10.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	55.85	62.83	4.71	12.91	94.00	128.48	51.39	20.65
6	10.00	11.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	69.82	76.80	4.71	16.14	113.61	164.23	65.69	26.82
7	11.50	13.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	83.79	90.77	4.71	19.36	133.23	203.22	81.29	33.89
8	13.00	14.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	97.76	104.74	4.71	22.59	152.85	245.43	98.17	41.87
9	14.50	16.00	1.50	Granular	9.31	0.00	30	-	19.50	22.44	1.00	-	15.25	16.00	104.74	104.74	4.71	25.94	192.42	310.93	124.37	50.78
10	16.00	17.50	1.50	Granular	9.31	0.00	30	-	19.50	22.44	1.00	-	16.75	17.50	104.74	104.74	4.71	25.94	192.42	336.87	134.75	59.69
11	17.50	19.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	104.74	104.74	4.71	25.94	193.10	363.48	145.39	68.60
12	19.00	20.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	104.74	104.74	4.71	25.94	193.10	389.42	155.77	77.51
13	20.50	22.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	104.74	104.74	4.71	25.94	193.10	415.36	166.14	86.42
14	22.00	23.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	104.74	104.74	4.71	25.94	193.10	441.29	176.52	95.33
15	23.50	25.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	104.74	104.74	4.71	25.94	193.10	467.23	186.89	104.25
16	25.00	26.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	104.74	104.74	4.71	25.94	193.10	493.17	197.27	113.16
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	104.74	104.74	4.71	25.94	193.10	519.10	207.64	122.07
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	104.74	104.74	4.71	25.94	193.10	545.04	218.02	130.98
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	104.74	104.74	1.57	8.65	193.10	553.68	221.47	133.95

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
3	24.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
6	28.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-24	-
Chainage	2+920	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.68	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-24	1.20	22.00	19.50	19.50	260.56	118.81	13.30	3.32
BH-24	1.20	23.50	21.00	21.00	276.33	132.23	13.30	3.32
BH-24	1.20	25.00	22.50	22.50	292.10	145.64	13.30	3.32
BH-24	1.20	26.50	24.00	24.00	307.87	159.06	13.30	3.32
BH-24	1.20	28.00	25.50	25.50	323.64	172.47	13.68	3.42
BH-24	1.20	29.50	27.00	27.00	339.41	185.88	13.68	3.42
BH-24	1.20	30.00	27.50	27.50	344.67	190.36	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	6.11	12.22	5.65	1.57	24.89	26.46	10.59	6.77
2	4.00	5.50	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	18.32	24.43	5.65	4.72	43.18	49.47	19.79	10.47
3	5.50	7.00	1.50	Granular	8.14	0.01	27	-	13.80	15.50	1.00	-	6.25	7.00	30.54	36.65	5.65	8.17	72.14	86.60	34.64	15.13
4	7.00	8.50	1.50	Granular	8.14	0.01	27	-	13.80	15.50	1.00	-	7.75	8.50	42.75	48.86	5.65	11.43	93.64	119.53	47.81	20.71
5	8.50	10.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	55.85	62.83	5.65	15.49	137.01	178.39	71.36	27.42
6	10.00	11.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	69.82	76.80	5.65	19.36	165.26	226.01	90.40	35.22
7	11.50	13.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	83.79	90.77	5.65	23.24	193.51	277.49	111.00	44.10
8	13.00	14.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	97.76	104.74	5.65	27.11	221.76	332.86	133.14	54.06
9	14.50	16.00	1.50	Granular	9.31	0.00	30	-	19.50	22.44	1.00	-	15.25	16.00	111.73	118.71	5.65	33.20	314.73	459.02	183.61	65.74
10	16.00	17.50	1.50	Granular	9.31	0.00	30	-	19.50	22.44	1.00	-	16.75	17.50	125.70	132.68	5.65	37.35	350.31	531.95	212.78	78.57
11	17.50	19.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	132.68	132.68	5.65	39.43	351.48	572.55	229.02	91.98
12	19.00	20.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	132.68	132.68	5.65	39.43	351.48	611.97	244.79	105.40
13	20.50	22.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	132.68	132.68	5.65	39.43	351.48	651.40	260.56	118.81
14	22.00	23.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	132.68	132.68	5.65	39.43	351.48	690.83	276.33	132.23
15	23.50	25.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	132.68	132.68	5.65	39.43	351.48	730.25	292.10	145.64
16	25.00	26.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	132.68	132.68	5.65	39.43	351.48	769.68	307.87	159.06
17	26.50	28.00	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	132.68	132.68	5.65	39.43	351.48	809.11	323.64	172.47
18	28.00	29.50	1.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	132.68	132.68	5.65	39.43	351.48	848.53	339.41	185.88
19	29.50	30.00	0.50	Granular	10.19	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	132.68	132.68	1.88	13.14	351.48	861.68	344.67	190.36

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
3	24.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
6	28.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-25	-
Chainage	2+033	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.62	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-25	1.00	22.00	19.50	18.00	154.30	86.94	11.06	2.77
BH-25	1.00	23.50	21.00	19.50	164.53	95.75	11.06	2.77
BH-25	1.00	25.00	22.50	21.00	174.76	104.56	11.38	2.85
BH-25	1.00	26.50	24.00	22.50	184.98	113.36	11.38	2.85
BH-25	1.00	28.00	25.50	24.00	212.68	122.68	11.70	2.93
BH-25	1.00	29.50	27.00	25.50	223.63	132.00	11.70	2.93
BH-25	1.00	30.00	27.50	26.00	227.29	135.11	12.01	3.00

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.29	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	16.41	21.88	4.71	3.52	26.17	29.69	11.88	7.03
3	5.50	7.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	6.25	7.00	29.15	36.42	4.71	6.74	57.14	67.40	26.96	10.57
4	7.00	8.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	7.75	8.50	43.69	50.96	4.71	10.10	77.56	97.92	39.17	15.05
5	8.50	10.00	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	58.23	65.50	4.71	13.46	97.98	131.79	52.72	20.46
6	10.00	11.50	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	72.77	80.04	4.71	16.82	118.40	169.03	67.61	26.82
7	11.50	13.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	87.69	95.33	4.71	20.99	158.32	229.94	91.98	34.35
8	13.00	14.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	102.98	110.62	4.71	24.65	182.57	278.85	111.54	42.90
9	14.50	16.00	1.50	Granular	10.19	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	110.62	110.62	4.71	24.65	140.73	261.65	104.66	51.45
10	16.00	17.50	1.50	Granular	10.19	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	110.62	110.62	4.71	24.65	140.73	286.31	114.52	60.00
11	17.50	19.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	18.25	19.00	110.62	110.62	4.71	26.48	182.57	354.63	141.85	69.07
12	19.00	20.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	19.75	20.50	110.62	110.62	4.71	26.48	182.57	381.11	152.44	78.13
13	20.50	22.00	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	21.25	22.00	110.62	110.62	4.71	25.57	161.65	385.76	154.30	86.94
14	22.00	23.50	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	22.75	23.50	110.62	110.62	4.71	25.57	161.65	411.32	164.53	95.75
15	23.50	25.00	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	24.25	25.00	110.62	110.62	4.71	25.57	161.65	436.89	174.76	104.56
16	25.00	26.50	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	25.75	26.50	110.62	110.62	4.71	25.57	161.65	462.46	184.98	113.36
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	110.62	110.62	4.71	27.39	203.50	531.69	212.68	122.68
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	110.62	110.62	4.71	27.39	203.50	559.09	223.63	132.00
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	110.62	110.62	1.57	9.13	203.50	568.22	227.29	135.11

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
7	30.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-25	-
Chainage	2+033	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	141.20	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-25	1.20	22.00	19.50	18.00	239.83	119.72	14.39	3.60
BH-25	1.20	23.50	21.00	19.50	255.50	133.06	14.39	3.60
BH-25	1.20	25.00	22.50	21.00	271.16	146.40	14.81	3.70
BH-25	1.20	26.50	24.00	22.50	286.83	159.74	14.81	3.70
BH-25	1.20	28.00	25.50	24.00	334.31	173.86	15.22	3.81
BH-25	1.20	29.50	27.00	25.50	351.09	187.98	15.22	3.81
BH-25	1.20	30.00	27.50	26.00	356.69	192.69	15.63	3.91

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.29	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	16.41	21.88	5.65	4.23	38.67	42.90	17.16	9.89
3	5.50	7.00	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	6.25	7.00	29.15	36.42	5.65	8.08	84.01	96.32	38.53	14.53
4	7.00	8.50	1.50	Granular	9.69	0.03	28	-	15.70	17.82	1.00	-	7.75	8.50	43.69	50.96	5.65	12.12	113.42	137.84	55.14	20.30
5	8.50	10.00	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	58.23	65.50	5.65	16.15	142.82	183.40	73.36	27.20
6	10.00	11.50	1.50	Granular	9.69	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	72.77	80.04	5.65	20.18	172.22	232.98	93.19	35.22
7	11.50	13.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	87.69	95.33	5.65	25.19	230.01	315.96	126.38	44.65
8	13.00	14.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	102.98	110.62	5.65	29.58	264.94	380.47	152.19	55.31
9	14.50	16.00	1.50	Granular	10.19	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	118.27	125.91	5.65	31.63	231.15	378.31	151.32	66.54
10	16.00	17.50	1.50	Granular	10.19	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	133.56	141.20	5.65	35.72	258.06	440.93	176.37	78.91
11	17.50	19.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	18.25	19.00	141.20	141.20	5.65	40.56	334.81	558.24	223.30	92.65
12	19.00	20.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	19.75	20.50	141.20	141.20	5.65	40.56	334.81	598.80	239.52	106.38
13	20.50	22.00	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	21.25	22.00	141.20	141.20	5.65	39.16	296.43	599.59	239.83	119.72
14	22.00	23.50	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	22.75	23.50	141.20	141.20	5.65	39.16	296.43	638.75	255.50	133.06
15	23.50	25.00	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	24.25	25.00	141.20	141.20	5.65	39.16	296.43	677.91	271.16	146.40
16	25.00	26.50	1.50	Granular	10.19	0.12	28	-	15.70	17.82	1.00	-	25.75	26.50	141.20	141.20	5.65	39.16	296.43	717.07	286.83	159.74
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	141.20	141.20	5.65	41.96	373.18	835.77	334.31	173.86
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	141.20	141.20	5.65	41.96	373.18	877.73	351.09	187.98
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	141.20	141.20	1.88	13.99	373.18	891.72	356.69	192.69

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
7	30.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-26	-
Chainage	3+122	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	97.93	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-26	1.00	22.00	19.50	18.00	152.37	80.33	8.99	2.25
BH-26	1.00	23.50	21.00	19.50	162.31	88.77	9.36	2.34
BH-26	1.00	25.00	22.50	21.00	172.01	97.20	10.06	2.51
BH-26	1.00	26.50	24.00	22.50	181.71	105.64	10.40	2.60
BH-26	1.00	28.00	25.50	24.00	191.41	114.08	10.73	2.68
BH-26	1.00	29.50	27.00	25.50	201.11	122.52	10.73	2.68
BH-26	1.00	30.00	27.50	26.00	204.35	125.34	11.06	2.77

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.74	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.81	11.62	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.74	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.42	23.23	4.71	3.31	17.73	21.04	8.42	6.97
3	5.50	7.00	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	29.04	34.85	4.71	5.75	29.31	38.37	15.35	10.23
4	7.00	8.50	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	40.65	46.46	4.71	8.05	38.26	55.38	22.15	14.14
5	8.50	10.00	1.50	Granular	7.74	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	52.27	58.08	4.71	12.08	86.35	115.54	46.22	19.17
6	10.00	11.50	1.50	Granular	7.74	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	63.88	69.69	4.71	14.76	102.66	146.62	58.65	24.95
7	11.50	13.00	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	12.25	13.00	76.75	83.81	4.71	18.37	139.50	201.83	80.73	31.75
8	13.00	14.50	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	13.75	14.50	90.87	97.93	4.71	21.75	161.90	245.98	98.39	39.49
9	14.50	16.00	1.50	Granular	9.41	0.09	27	-	13.80	15.50	1.00	-	15.25	16.00	97.93	97.93	4.71	21.83	124.80	230.70	92.28	47.25
10	16.00	17.50	1.50	Granular	9.41	0.09	27	-	13.80	15.50	1.00	-	16.75	17.50	97.93	97.93	4.71	21.83	124.80	252.53	101.01	55.01
11	17.50	19.00	1.50	Granular	9.41	0.10	30	-	19.50	22.44	1.00	-	18.25	19.00	97.93	97.93	4.71	24.25	180.45	332.43	132.97	63.45
12	19.00	20.50	1.50	Granular	9.41	0.10	30	-	19.50	22.44	1.00	-	19.75	20.50	97.93	97.93	4.71	24.25	180.45	356.68	142.67	71.89
13	20.50	22.00	1.50	Granular	9.41	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	97.93	97.93	4.71	24.25	180.45	380.93	152.37	80.33
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	97.93	97.93	4.71	24.25	181.05	405.78	162.31	88.77
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	97.93	97.93	4.71	24.25	181.05	430.03	172.01	97.20
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	97.93	97.93	4.71	24.25	181.05	454.28	181.71	105.64
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	97.93	97.93	4.71	24.25	181.05	478.54	191.41	114.08
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	97.93	97.93	4.71	24.25	181.05	502.79	201.11	122.52
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	97.93	97.93	1.57	8.08	181.05	510.87	204.35	125.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.10	2.00	1.83	7.30	6.67	0.222	0.889	8.99	2.25	32.83	14.99	21.59	5.40	78.79	35.98
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.11	2.00	1.83	7.20	6.58	0.214	0.855	9.36	2.34	33.70	15.40	22.46	5.61	80.89	36.95
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
5	27.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-26	-
Chainage	3+122	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	126.17	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-26	1.20	22.00	19.50	18.00	242.87	111.36	11.71	2.93
BH-26	1.20	23.50	21.00	19.50	258.28	124.23	12.18	3.05
BH-26	1.20	25.00	22.50	21.00	273.28	137.11	13.09	3.27
BH-26	1.20	26.50	24.00	22.50	288.27	149.98	13.53	3.38
BH-26	1.20	28.00	25.50	24.00	303.27	162.85	13.97	3.49
BH-26	1.20	29.50	27.00	25.50	318.27	175.72	13.97	3.49
BH-26	1.20	30.00	27.50	26.00	323.26	180.02	14.39	3.60

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.74	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.81	11.62	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.74	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.42	23.23	5.65	3.97	26.06	30.03	12.01	9.82
3	5.50	7.00	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	29.04	34.85	5.65	6.90	42.91	53.78	21.51	14.13
4	7.00	8.50	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	40.65	46.46	5.65	9.66	55.80	76.34	30.54	19.21
5	8.50	10.00	1.50	Granular	7.74	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	52.27	58.08	5.65	14.50	125.72	160.75	64.30	25.64
6	10.00	11.50	1.50	Granular	7.74	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	63.88	69.69	5.65	17.72	149.21	201.96	80.78	32.98
7	11.50	13.00	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	12.25	13.00	76.75	83.81	5.65	22.05	202.76	277.55	111.02	41.53
8	13.00	14.50	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	13.75	14.50	90.87	97.93	5.65	26.10	235.02	335.91	134.37	51.21
9	14.50	16.00	1.50	Granular	9.41	0.09	27	-	13.80	15.50	1.00	-	15.25	16.00	104.99	112.05	5.65	28.08	206.03	335.01	134.00	61.45
10	16.00	17.50	1.50	Granular	9.41	0.09	27	-	13.80	15.50	1.00	-	16.75	17.50	119.11	126.17	5.65	31.85	230.88	391.71	156.68	72.74
11	17.50	19.00	1.50	Granular	9.41	0.10	30	-	19.50	22.44	1.00	-	18.25	19.00	126.17	126.17	5.65	37.49	333.86	532.19	212.87	85.61
12	19.00	20.50	1.50	Granular	9.41	0.10	30	-	19.50	22.44	1.00	-	19.75	20.50	126.17	126.17	5.65	37.49	333.86	569.68	227.87	98.49
13	20.50	22.00	1.50	Granular	9.41	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	126.17	126.17	5.65	37.49	333.86	607.17	242.87	111.36
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	126.17	126.17	5.65	37.49	334.90	645.70	258.28	124.23
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	126.17	126.17	5.65	37.49	334.90	683.19	273.28	137.11
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	126.17	126.17	5.65	37.49	334.90	720.68	288.27	149.98
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	126.17	126.17	5.65	37.49	334.90	758.17	303.27	162.85
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	126.17	126.17	5.65	37.49	334.90	795.67	318.27	175.72
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	126.17	126.17	1.88	12.50	334.90	808.16	323.26	180.02

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.95	2.02	1.84	8.52	7.74	0.171	0.683	11.71	2.93	49.92	22.66	28.11	7.03	119.81	54.38
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.96	2.02	1.84	8.41	7.64	0.164	0.657	12.18	3.05	51.25	23.27	29.24	7.31	122.99	55.85
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
5	27.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-27	-
Chainage	3+205	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.73	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-27	1.00	22.00	19.50	19.50	163.95	84.90	10.74	2.68
BH-27	1.00	23.50	21.00	21.00	174.33	93.81	11.02	2.76
BH-27	1.00	25.00	22.50	22.50	184.70	102.72	11.02	2.76
BH-27	1.00	26.50	24.00	24.00	195.07	111.63	11.30	2.83
BH-27	1.00	28.00	25.50	25.50	205.45	120.54	11.30	2.83
BH-27	1.00	29.50	27.00	27.00	215.82	129.45	11.30	2.83
BH-27	1.00	30.00	27.50	27.50	219.28	132.42	11.58	2.89

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.16	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	5.37	10.75	4.71	1.15	14.53	15.69	6.27	4.72
2	4.00	5.50	1.50	Granular	7.16	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	16.12	21.49	4.71	3.46	25.71	30.32	12.13	7.34
3	5.50	7.00	1.50	Granular	7.16	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	26.86	32.24	4.71	5.54	30.47	40.62	16.25	10.54
4	7.00	8.50	1.50	Granular	9.31	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	39.22	46.21	4.71	8.09	43.30	61.54	24.62	14.46
5	8.50	10.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	53.19	60.18	4.71	12.29	90.27	120.81	48.32	19.55
6	10.00	11.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	67.16	74.15	4.71	15.52	109.88	155.95	62.38	25.54
7	11.50	13.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	81.79	89.44	4.71	19.58	148.96	214.61	85.84	32.67
8	13.00	14.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	97.08	104.73	4.71	23.24	173.22	262.10	104.84	40.83
9	14.50	16.00	1.50	Granular	10.19	0.11	29	-	17.60	20.13	1.00	-	15.25	16.00	104.73	104.73	4.71	25.07	173.22	287.17	114.87	49.50
10	16.00	17.50	1.50	Granular	10.19	0.11	29	-	17.60	20.13	1.00	-	16.75	17.50	104.73	104.73	4.71	25.07	173.22	312.24	124.90	58.17
11	17.50	19.00	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	18.25	19.00	104.73	104.73	4.71	25.93	193.07	358.02	143.21	67.08
12	19.00	20.50	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	19.75	20.50	104.73	104.73	4.71	25.93	193.07	383.95	153.58	75.99
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	104.73	104.73	4.71	25.93	193.07	409.89	163.95	84.90
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	104.73	104.73	4.71	25.93	193.07	435.82	174.33	93.81
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	104.73	104.73	4.71	25.93	193.07	461.75	184.70	102.72
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	104.73	104.73	4.71	25.93	193.07	487.68	195.07	111.63
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	104.73	104.73	4.71	25.93	193.07	513.62	205.45	120.54
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	104.73	104.73	4.71	25.93	193.07	539.55	215.82	129.45
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	104.73	104.73	1.57	8.64	193.07	548.20	219.28	132.42

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
2	22.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
3	24.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
4	25.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
5	27.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	30.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-27	-
Chainage	3+205	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	135.31	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-27	1.20	22.00	19.50	19.50	261.76	117.78	14.06	3.51
BH-27	1.20	23.50	21.00	21.00	277.84	131.41	14.43	3.61
BH-27	1.20	25.00	22.50	22.50	293.92	145.04	14.43	3.61
BH-27	1.20	26.50	24.00	24.00	310.00	158.68	14.79	3.70
BH-27	1.20	28.00	25.50	25.50	326.09	172.31	14.79	3.70
BH-27	1.20	29.50	27.00	27.00	342.17	185.94	14.79	3.70
BH-27	1.20	30.00	27.50	27.50	347.53	190.49	15.15	3.79

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.16	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	5.37	10.75	5.65	1.38	21.89	23.28	9.31	6.72
2	4.00	5.50	1.50	Granular	7.16	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	16.12	21.49	5.65	4.15	37.98	43.52	17.41	10.26
3	5.50	7.00	1.50	Granular	7.16	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	26.86	32.24	5.65	6.65	44.69	56.87	22.75	14.50
4	7.00	8.50	1.50	Granular	9.31	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	39.22	46.21	5.65	9.71	63.40	85.30	34.12	19.59
5	8.50	10.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	53.19	60.18	5.65	14.75	131.64	168.29	67.32	26.10
6	10.00	11.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	67.16	74.15	5.65	18.63	159.89	215.17	86.07	33.69
7	11.50	13.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	81.79	89.44	5.65	23.49	216.54	295.31	118.13	42.64
8	13.00	14.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	97.08	104.73	5.65	27.89	251.47	358.13	143.25	52.82
9	14.50	16.00	1.50	Granular	10.19	0.11	29	-	17.60	20.13	1.00	-	15.25	16.00	112.37	120.02	5.65	32.28	286.41	425.34	170.14	64.24
10	16.00	17.50	1.50	Granular	10.19	0.11	29	-	17.60	20.13	1.00	-	16.75	17.50	127.66	135.31	5.65	36.67	321.34	496.94	198.78	76.88
11	17.50	19.00	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	18.25	19.00	135.31	135.31	5.65	40.21	358.16	573.98	229.59	90.51
12	19.00	20.50	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	19.75	20.50	135.31	135.31	5.65	40.21	358.16	614.18	245.67	104.14
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	135.31	135.31	5.65	40.21	358.16	654.39	261.76	117.78
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	135.31	135.31	5.65	40.21	358.16	694.60	277.84	131.41
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	135.31	135.31	5.65	40.21	358.16	734.80	293.92	145.04
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	135.31	135.31	5.65	40.21	358.16	775.01	310.00	158.68
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	135.31	135.31	5.65	40.21	358.16	815.22	326.09	172.31
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	135.31	135.31	5.65	40.21	358.16	855.42	342.17	185.94
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	135.31	135.31	1.88	13.40	358.16	868.82	347.53	190.49

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
2	22.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
3	24.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
4	25.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
5	27.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	30.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-28	-
Chainage	3+304	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	95.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-28	1.00	22.00	19.50	15.00	141.74	74.01	10.07	2.52
BH-28	1.00	23.50	21.00	16.50	151.18	82.27	10.48	2.62
BH-28	1.00	25.00	22.50	18.00	160.63	90.53	10.48	2.62
BH-28	1.00	26.50	24.00	19.50	170.07	98.78	10.48	2.62
BH-28	1.00	28.00	25.50	21.00	179.51	107.04	10.48	2.62
BH-28	1.00	29.50	27.00	22.50	188.95	115.30	10.48	2.62
BH-28	1.00	30.00	27.50	23.00	192.10	118.05	10.87	2.72

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.16	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.37	10.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.16	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.12	21.49	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.16	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	26.86	32.24	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	38.04	43.85	4.71	7.54	36.25	43.79	17.52	11.46
5	8.50	10.00	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	49.66	55.47	4.71	10.66	61.31	79.50	31.80	16.09
6	10.00	11.50	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	61.27	67.08	4.71	13.15	73.38	104.73	41.89	21.42
7	11.50	13.00	1.50	Granular	9.41	0.03	26	-	11.90	13.19	1.00	-	12.25	13.00	74.14	81.20	4.71	15.91	88.85	136.10	54.44	27.53
8	13.00	14.50	1.50	Granular	9.41	0.03	26	-	11.90	13.19	1.00	-	13.75	14.50	88.26	95.32	4.71	18.94	103.53	169.73	67.89	34.48
9	14.50	16.00	1.50	Granular	9.41	0.12	27	-	13.80	15.50	1.00	-	15.25	16.00	95.32	95.32	4.71	21.24	121.61	209.05	83.62	42.08
10	16.00	17.50	1.50	Granular	9.41	0.12	27	-	13.80	15.50	1.00	-	16.75	17.50	95.32	95.32	4.71	21.24	121.61	230.29	92.12	49.67
11	17.50	19.00	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	95.32	95.32	4.71	22.82	157.76	289.26	115.70	57.71
12	19.00	20.50	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	95.32	95.32	4.71	22.82	158.30	312.62	125.05	65.75
13	20.50	22.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	95.32	95.32	4.71	23.60	176.43	354.36	141.74	74.01
14	22.00	23.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	95.32	95.32	4.71	23.60	176.43	377.96	151.18	82.27
15	23.50	25.00	1.50	Granular	10.19	0.12	30	-	19.50	22.44	1.00	-	24.25	25.00	95.32	95.32	4.71	23.60	176.43	401.56	160.63	90.53
16	25.00	26.50	1.50	Granular	10.19	0.12	30	-	19.50	22.44	1.00	-	25.75	26.50	95.32	95.32	4.71	23.60	176.43	425.17	170.07	98.78
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	95.32	95.32	4.71	23.60	176.43	448.77	179.51	107.04
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	95.32	95.32	4.71	23.60	176.43	472.38	188.95	115.30
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	95.32	95.32	1.57	7.87	176.43	480.24	192.10	118.05

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
3	24.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
4	25.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
5	27.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
6	28.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.95	1.93	1.81	6.94	6.50	0.191	0.763	10.48	2.62	36.35	17.02	25.15	6.29	87.23	40.84
7	30.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.97	1.93	1.80	6.85	6.42	0.184	0.736	10.87	2.72	37.26	17.45	26.10	6.52	89.42	41.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-28	-
Chainage	3+304	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	123.56	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-28	1.20	22.00	19.50	15.00	229.57	103.62	13.10	3.27
BH-28	1.20	23.50	21.00	16.50	244.26	116.28	13.63	3.41
BH-28	1.20	25.00	22.50	18.00	258.94	128.93	13.63	3.41
BH-28	1.20	26.50	24.00	19.50	273.63	141.59	13.63	3.41
BH-28	1.20	28.00	25.50	21.00	288.32	154.25	13.63	3.41
BH-28	1.20	29.50	27.00	22.50	303.00	166.90	13.63	3.41
BH-28	1.20	30.00	27.50	23.00	307.90	171.12	14.14	3.54

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Coeff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.16	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.37	10.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.16	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.12	21.49	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.16	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	26.86	32.24	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.74	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	38.04	43.85	5.65	9.04	52.91	61.95	24.78	15.99
5	8.50	10.00	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	49.66	55.47	5.65	12.79	89.33	111.16	44.46	21.95
6	10.00	11.50	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	61.27	67.08	5.65	15.78	106.72	144.33	57.73	28.74
7	11.50	13.00	1.50	Granular	9.41	0.03	26	-	11.90	13.19	1.00	-	12.25	13.00	74.14	81.20	5.65	19.09	129.21	185.92	74.37	36.46
8	13.00	14.50	1.50	Granular	9.41	0.03	26	-	11.90	13.19	1.00	-	13.75	14.50	88.26	95.32	5.65	22.73	150.36	229.79	91.92	45.20
9	14.50	16.00	1.50	Granular	9.41	0.12	27	-	13.80	15.50	1.00	-	15.25	16.00	102.38	109.44	5.65	27.38	201.44	308.25	123.30	55.24
10	16.00	17.50	1.50	Granular	9.41	0.12	27	-	13.80	15.50	1.00	-	16.75	17.50	116.50	123.56	5.65	31.16	226.28	364.26	145.70	66.34
11	17.50	19.00	1.50	Granular	9.41	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	123.56	123.56	5.65	35.49	293.57	467.04	186.81	78.65
12	19.00	20.50	1.50	Granular	10.19	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	123.56	123.56	5.65	35.49	294.51	503.46	201.39	90.97
13	20.50	22.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	123.56	123.56	5.65	36.72	328.25	573.92	229.57	103.62
14	22.00	23.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	123.56	123.56	5.65	36.72	328.25	610.64	244.26	116.28
15	23.50	25.00	1.50	Granular	10.19	0.12	30	-	19.50	22.44	1.00	-	24.25	25.00	123.56	123.56	5.65	36.72	328.25	647.36	258.94	128.93
16	25.00	26.50	1.50	Granular	10.19	0.12	30	-	19.50	22.44	1.00	-	25.75	26.50	123.56	123.56	5.65	36.72	328.25	684.07	273.63	141.59
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	123.56	123.56	5.65	36.72	328.25	720.79	288.32	154.25
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	123.56	123.56	5.65	36.72	328.25	757.51	303.00	166.90
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	123.56	123.56	1.88	12.24	328.25	769.74	307.90	171.12

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
3	24.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
4	25.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
5	27.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
6	28.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.587	13.63	3.41	55.22	25.69	32.70	8.18	132.53	61.66
7	30.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.70	1.95	1.81	8.01	7.45	0.141	0.566	14.14	3.54	56.61	26.35	33.94	8.49	135.86	63.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-28A	-
Chainage	3+367	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	97.96	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-28A	1.00	22.00	19.50	19.50	150.78	79.14	8.28	2.07
BH-28A	1.00	23.50	21.00	21.00	160.48	87.58	8.28	2.07
BH-28A	1.00	25.00	22.50	22.50	170.19	96.02	8.61	2.15
BH-28A	1.00	26.50	24.00	24.00	179.89	104.46	8.61	2.15
BH-28A	1.00	28.00	25.50	25.50	189.59	112.90	8.61	2.15
BH-28A	1.00	29.50	27.00	27.00	199.30	121.34	8.61	2.15
BH-28A	1.00	30.00	27.50	27.50	202.53	124.16	8.61	2.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	6.11	12.22	4.71	1.31	16.52	17.83	7.13	4.77
2	4.00	5.50	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	18.32	24.43	4.71	3.93	29.22	34.47	13.79	7.52
3	5.50	7.00	1.50	Granular	7.74	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	30.24	36.05	4.71	6.49	41.11	52.84	21.14	10.98
4	7.00	8.50	1.50	Granular	7.74	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	41.85	47.66	4.71	8.98	53.19	73.90	29.56	15.15
5	8.50	10.00	1.50	Granular	7.74	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	53.47	59.28	4.71	11.03	53.89	85.63	34.25	19.88
6	10.00	11.50	1.50	Granular	7.74	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	65.08	70.89	4.71	13.43	63.85	109.02	43.61	25.29
7	11.50	13.00	1.50	Granular	9.02	0.03	26	-	11.90	13.19	1.00	-	12.25	13.00	77.66	84.43	4.71	16.67	92.02	153.86	61.55	31.61
8	13.00	14.50	1.50	Granular	9.02	0.03	26	-	11.90	13.19	1.00	-	13.75	14.50	91.19	97.96	4.71	19.57	106.09	187.51	75.00	38.74
9	14.50	16.00	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	97.96	97.96	4.71	21.83	124.62	227.87	91.15	46.50
10	16.00	17.50	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	97.96	97.96	4.71	21.83	124.62	249.70	99.88	54.26
11	17.50	19.00	1.50	Granular	9.02	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	97.96	97.96	4.71	23.45	161.68	310.20	124.08	62.48
12	19.00	20.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	97.96	97.96	4.71	23.45	162.14	334.12	133.65	70.69
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	97.96	97.96	4.71	24.26	180.72	376.95	150.78	79.14
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	97.96	97.96	4.71	24.26	180.72	401.21	160.48	87.58
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	97.96	97.96	4.71	24.26	180.72	425.47	170.19	96.02
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	97.96	97.96	4.71	24.26	180.72	449.73	179.89	104.46
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	97.96	97.96	4.71	24.26	180.72	473.99	189.59	112.90
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	97.96	97.96	4.71	24.26	180.72	498.24	199.30	121.34
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	97.96	97.96	1.57	8.09	180.72	506.33	202.53	124.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
2	22.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
3	24.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
4	25.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
5	27.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
6	28.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	30.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-28A	-
Chainage	3+367	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.03	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-28A	1.20	22.00	19.50	19.50	239.06	109.40	10.85	2.71
BH-28A	1.20	23.50	21.00	21.00	253.92	122.18	10.85	2.71
BH-28A	1.20	25.00	22.50	22.50	268.78	134.96	11.28	2.82
BH-28A	1.20	26.50	24.00	24.00	283.64	147.74	11.28	2.82
BH-28A	1.20	28.00	25.50	25.50	298.50	160.51	11.28	2.82
BH-28A	1.20	29.50	27.00	27.00	313.37	173.29	11.28	2.82
BH-28A	1.20	30.00	27.50	27.50	318.32	177.55	11.28	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	6.11	12.22	5.65	1.57	24.89	26.46	10.59	6.77
2	4.00	5.50	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	18.32	24.43	5.65	4.72	43.18	49.47	19.79	10.47
3	5.50	7.00	1.50	Granular	7.74	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	30.24	36.05	5.65	7.79	60.25	74.33	29.73	15.03
4	7.00	8.50	1.50	Granular	7.74	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	41.85	47.66	5.65	10.78	77.64	102.50	41.00	20.42
5	8.50	10.00	1.50	Granular	7.74	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	53.47	59.28	5.65	13.24	78.47	116.57	46.63	26.50
6	10.00	11.50	1.50	Granular	7.74	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	65.08	70.89	5.65	16.12	92.82	147.03	58.81	33.39
7	11.50	13.00	1.50	Granular	9.02	0.03	26	-	11.90	13.19	1.00	-	12.25	13.00	77.66	84.43	5.65	20.00	133.73	207.94	83.18	41.36
8	13.00	14.50	1.50	Granular	9.02	0.03	26	-	11.90	13.19	1.00	-	13.75	14.50	91.19	97.96	5.65	23.49	153.99	251.69	100.68	50.31
9	14.50	16.00	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	104.73	111.50	5.65	28.01	204.69	330.39	132.16	60.53
10	16.00	17.50	1.50	Granular	9.02	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	118.26	125.03	5.65	31.63	228.51	385.84	154.34	71.76
11	17.50	19.00	1.50	Granular	9.02	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	125.03	125.03	5.65	35.91	296.46	489.71	195.88	84.19
12	19.00	20.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	125.03	125.03	5.65	35.91	297.26	526.43	210.57	96.62
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	125.03	125.03	5.65	37.15	331.33	597.65	239.06	109.40
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	125.03	125.03	5.65	37.15	331.33	634.80	253.92	122.18
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	125.03	125.03	5.65	37.15	331.33	671.95	268.78	134.96
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	125.03	125.03	5.65	37.15	331.33	709.11	283.64	147.74
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	125.03	125.03	5.65	37.15	331.33	746.26	298.50	160.51
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	125.03	125.03	5.65	37.15	331.33	783.41	313.37	173.29
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	125.03	125.03	1.88	12.38	331.33	795.80	318.32	177.55

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
2	22.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
3	24.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
4	25.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
5	27.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
6	28.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	30.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-29	-
Chainage	3+391	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-29	1.00	22.00	19.50	19.50	162.51	84.01	8.93	2.23
BH-29	1.00	23.50	21.00	21.00	172.88	92.92	8.93	2.23
BH-29	1.00	25.00	22.50	22.50	183.25	101.83	8.93	2.23
BH-29	1.00	26.50	24.00	24.00	193.62	110.73	8.93	2.23
BH-29	1.00	28.00	25.50	25.50	203.99	119.64	8.93	2.23
BH-29	1.00	29.50	27.00	27.00	214.36	128.55	8.93	2.23
BH-29	1.00	30.00	27.50	27.50	217.82	131.52	8.93	2.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	3.25	4.00	5.81	11.62	4.71	1.25	15.71	16.96	6.78	4.75
2	4.00	5.50	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	4.75	5.50	17.42	23.23	4.71	3.74	27.79	32.77	13.11	7.44
3	5.50	7.00	1.50	Granular	7.74	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	29.04	34.85	4.71	6.23	39.86	51.08	20.43	10.84
4	7.00	8.50	1.50	Granular	9.31	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	41.83	48.82	4.71	8.98	55.13	75.32	30.13	15.00
5	8.50	10.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	55.80	62.79	4.71	12.90	93.93	127.02	50.81	20.26
6	10.00	11.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	69.77	76.76	4.71	16.13	113.55	162.77	65.11	26.43
7	11.50	13.00	1.50	Granular	9.31	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	83.74	90.73	4.71	20.05	150.40	219.66	87.86	33.69
8	13.00	14.50	1.50	Granular	9.31	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	97.71	104.70	4.71	23.39	172.56	265.21	106.09	41.89
9	14.50	16.00	1.50	Granular	9.41	0.07	27	-	13.80	15.50	1.00	-	15.25	16.00	104.70	104.70	4.71	23.33	133.06	249.05	99.62	50.07
10	16.00	17.50	1.50	Granular	9.41	0.07	27	-	13.80	15.50	1.00	-	16.75	17.50	104.70	104.70	4.71	23.33	133.06	272.38	108.95	58.25
11	17.50	19.00	1.50	Granular	9.41	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	104.70	104.70	4.71	24.20	152.85	316.36	126.54	66.68
12	19.00	20.50	1.50	Granular	9.41	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	104.70	104.70	4.71	24.20	152.85	340.56	136.22	75.10
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	104.70	104.70	4.71	25.93	192.63	406.27	162.51	84.01
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	104.70	104.70	4.71	25.93	192.63	432.19	172.88	92.92
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	104.70	104.70	4.71	25.93	192.63	458.12	183.25	101.83
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	104.70	104.70	4.71	25.93	192.63	484.05	193.62	110.73
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	104.70	104.70	4.71	25.93	192.63	509.97	203.99	119.64
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	104.70	104.70	4.71	25.93	192.63	535.90	214.36	128.55
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	104.70	104.70	1.57	8.64	192.63	544.54	217.82	131.52

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
4	25.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
5	27.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
6	28.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
7	30.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-29	-
Chainage	3+391	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.94	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-29	1.20	22.00	19.50	19.50	255.77	115.47	11.70	2.93
BH-29	1.20	23.50	21.00	21.00	271.58	128.90	11.70	2.93
BH-29	1.20	25.00	22.50	22.50	287.38	142.34	11.70	2.93
BH-29	1.20	26.50	24.00	24.00	303.18	155.77	11.70	2.93
BH-29	1.20	28.00	25.50	25.50	318.98	169.21	11.70	2.93
BH-29	1.20	29.50	27.00	27.00	334.78	182.64	11.70	2.93
BH-29	1.20	30.00	27.50	27.50	340.05	187.12	11.70	2.93

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	3.25	4.00	5.81	11.62	5.65	1.50	23.67	25.16	10.07	6.75
2	4.00	5.50	1.50	Granular	7.74	0.03	26	-	11.90	13.19	1.00	-	4.75	5.50	17.42	23.23	5.65	4.49	41.06	47.04	18.82	10.38
3	5.50	7.00	1.50	Granular	7.74	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	29.04	34.85	5.65	7.48	58.45	71.91	28.76	14.85
4	7.00	8.50	1.50	Granular	9.31	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	41.83	48.82	5.65	10.77	80.64	104.87	41.95	20.24
5	8.50	10.00	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	55.80	62.79	5.65	15.48	136.92	176.63	70.65	26.95
6	10.00	11.50	1.50	Granular	9.31	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	69.77	76.76	5.65	19.35	165.17	224.23	89.69	34.75
7	11.50	13.00	1.50	Granular	9.31	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	83.74	90.73	5.65	24.05	218.44	301.55	120.62	43.86
8	13.00	14.50	1.50	Granular	9.31	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	97.71	104.70	5.65	28.07	250.35	361.53	144.61	54.09
9	14.50	16.00	1.50	Granular	9.41	0.07	27	-	13.80	15.50	1.00	-	15.25	16.00	111.76	118.82	5.65	29.89	217.93	359.00	143.60	64.83
10	16.00	17.50	1.50	Granular	9.41	0.07	27	-	13.80	15.50	1.00	-	16.75	17.50	125.88	132.94	5.65	33.66	242.78	417.52	167.01	76.63
11	17.50	19.00	1.50	Granular	9.41	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	132.94	132.94	5.65	36.87	278.89	490.49	196.19	89.33
12	19.00	20.50	1.50	Granular	9.41	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	132.94	132.94	5.65	36.87	278.89	527.36	210.94	102.03
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	132.94	132.94	5.65	39.50	351.46	639.44	255.77	115.47
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	132.94	132.94	5.65	39.50	351.46	678.94	271.58	128.90
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	132.94	132.94	5.65	39.50	351.46	718.44	287.38	142.34
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	132.94	132.94	5.65	39.50	351.46	757.94	303.18	155.77
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	132.94	132.94	5.65	39.50	351.46	797.45	318.98	169.21
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	132.94	132.94	5.65	39.50	351.46	836.95	334.78	182.64
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	132.94	132.94	1.88	13.17	351.46	850.12	340.05	187.12

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
4	25.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
5	27.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
6	28.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
7	30.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-30	-
Chainage	3+514	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	94.72	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-30	1.00	22.00	19.50	19.50	149.54	79.87	8.61	2.15
BH-30	1.00	23.50	21.00	21.00	158.92	88.08	8.61	2.15
BH-30	1.00	25.00	22.50	22.50	168.30	96.30	8.93	2.23
BH-30	1.00	26.50	24.00	24.00	177.68	104.52	8.93	2.23
BH-30	1.00	28.00	25.50	25.50	187.06	112.74	8.93	2.23
BH-30	1.00	29.50	27.00	27.00	196.45	120.95	8.93	2.23
BH-30	1.00	30.00	27.50	27.50	199.57	123.69	8.93	2.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Coeff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sf})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	6.11	12.22	4.71	0.00	16.52	16.52	6.61	4.40
2	4.00	5.50	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	18.32	24.43	4.71	3.93	29.22	33.15	13.26	7.15
3	5.50	7.00	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	30.54	36.65	4.71	6.55	41.92	52.41	20.96	10.63
4	7.00	8.50	1.50	Granular	7.74	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	42.45	48.26	4.71	9.11	53.81	73.41	29.36	14.83
5	8.50	10.00	1.50	Granular	7.74	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	54.07	59.88	4.71	12.05	77.38	109.03	43.61	19.86
6	10.00	11.50	1.50	Granular	7.74	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	65.68	71.49	4.71	14.64	91.58	137.86	55.14	25.60
7	11.50	13.00	1.50	Granular	7.74	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	77.30	83.11	4.71	17.87	121.50	185.65	74.26	32.26
8	13.00	14.50	1.50	Granular	7.74	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	88.91	94.72	4.71	20.55	137.81	222.51	89.00	39.66
9	14.50	16.00	1.50	Granular	9.31	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	94.72	94.72	4.71	22.67	156.74	264.11	105.64	47.66
10	16.00	17.50	1.50	Granular	9.31	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	94.72	94.72	4.71	22.67	156.74	286.78	114.71	55.66
11	17.50	19.00	1.50	Granular	9.31	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	94.72	94.72	4.71	22.67	156.74	309.46	123.78	63.65
12	19.00	20.50	1.50	Granular	9.31	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	94.72	94.72	4.71	22.67	156.74	332.13	132.85	71.65
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	94.72	94.72	4.71	23.46	174.99	373.84	149.54	79.87
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	94.72	94.72	4.71	23.46	174.99	397.29	158.92	88.08
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	94.72	94.72	4.71	23.46	174.99	420.75	168.30	96.30
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	94.72	94.72	4.71	23.46	174.99	444.20	177.68	104.52
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	94.72	94.72	4.71	23.46	174.99	467.66	187.06	112.74
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	94.72	94.72	4.71	23.46	174.99	491.11	196.45	120.95
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	94.72	94.72	1.57	7.82	174.99	498.93	199.57	123.69

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
4	25.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
5	27.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
6	28.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
7	30.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-30	-
Chainage	3+514	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	122.66	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-30	1.20	22.00	19.50	19.50	238.52	110.71	11.28	2.82
BH-30	1.20	23.50	21.00	21.00	253.10	123.29	11.28	2.82
BH-30	1.20	25.00	22.50	22.50	267.68	135.88	11.70	2.93
BH-30	1.20	26.50	24.00	24.00	282.26	148.46	11.70	2.93
BH-30	1.20	28.00	25.50	25.50	296.84	161.04	11.70	2.93
BH-30	1.20	29.50	27.00	27.00	311.41	173.62	11.70	2.93
BH-30	1.20	30.00	27.50	27.50	316.27	177.81	11.70	2.93

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	6.11	12.22	5.65	0.00	24.89	24.89	9.96	6.33
2	4.00	5.50	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	18.32	24.43	5.65	4.72	43.18	47.90	19.16	10.03
3	5.50	7.00	1.50	Granular	8.14	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	30.54	36.65	5.65	7.86	61.47	74.05	29.62	14.61
4	7.00	8.50	1.50	Granular	7.74	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	42.45	48.26	5.65	10.93	78.54	102.05	40.82	20.04
5	8.50	10.00	1.50	Granular	7.74	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	54.07	59.88	5.65	14.46	112.64	150.62	60.25	26.47
6	10.00	11.50	1.50	Granular	7.74	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	65.68	71.49	5.65	17.57	133.08	188.63	75.45	33.76
7	11.50	13.00	1.50	Granular	7.74	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	77.30	83.11	5.65	21.44	176.33	253.31	101.33	42.14
8	13.00	14.50	1.50	Granular	7.74	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	88.91	94.72	5.65	24.66	199.82	301.46	120.58	51.42
9	14.50	16.00	1.50	Granular	9.31	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	101.71	108.69	5.65	29.21	259.48	390.33	156.13	61.97
10	16.00	17.50	1.50	Granular	9.31	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	115.68	122.66	5.65	33.23	291.39	455.48	182.19	73.65
11	17.50	19.00	1.50	Granular	9.31	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	122.66	122.66	5.65	35.23	291.39	490.71	196.28	85.89
12	19.00	20.50	1.50	Granular	9.31	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	122.66	122.66	5.65	35.23	291.39	525.94	210.38	98.13
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	122.66	122.66	5.65	36.45	325.29	596.29	238.52	110.71
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	122.66	122.66	5.65	36.45	325.29	632.74	253.10	123.29
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	122.66	122.66	5.65	36.45	325.29	669.19	267.68	135.88
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	122.66	122.66	5.65	36.45	325.29	705.64	282.26	148.46
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	122.66	122.66	5.65	36.45	325.29	742.09	296.84	161.04
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	122.66	122.66	5.65	36.45	325.29	778.54	311.41	173.62
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	122.66	122.66	1.88	12.15	325.29	790.69	316.27	177.81

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
4	25.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
5	27.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
6	28.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
7	30.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48

A.5. Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-31	1.00	22.00	19.50	19.50	331.78	147.37	8.28	2.07	331.78	147.37	8.28	2.07
BH-31	1.00	23.50	21.00	21.00	353.17	164.00	8.28	2.07	353.17	164.00	8.28	2.07
BH-31	1.00	25.00	22.50	22.50	374.57	180.62	8.28	2.07	374.57	180.62	8.28	2.07
BH-31	1.00	26.50	24.00	24.00	395.96	197.25	8.28	2.07	395.96	197.25	8.28	2.07
BH-31	1.00	28.00	25.50	25.50	417.51	213.88	8.28	2.07	417.51	213.88	8.28	2.07
BH-31	1.00	29.50	27.00	27.00	438.91	230.50	8.61	2.15	438.91	230.50	8.61	2.15
BH-31	1.00	30.00	27.50	27.50	446.04	236.04	8.61	2.15	446.04	236.04	8.61	2.15
BH-31	1.20	22.00	19.50	19.50	501.94	197.31	10.85	2.71	501.94	197.31	10.85	2.71
BH-31	1.20	23.50	21.00	21.00	532.82	221.30	10.85	2.71	532.82	221.30	10.85	2.71
BH-31	1.20	25.00	22.50	22.50	563.70	245.29	10.85	2.71	563.70	245.29	10.85	2.71
BH-31	1.20	26.50	24.00	24.00	594.58	269.28	10.85	2.71	594.58	269.28	10.85	2.71
BH-31	1.20	28.00	25.50	25.50	625.72	293.27	10.85	2.71	625.72	293.27	10.85	2.71
BH-31	1.20	29.50	27.00	27.00	656.60	317.26	11.28	2.82	656.60	317.26	11.28	2.82
BH-31	1.20	30.00	27.50	27.50	666.89	325.26	11.28	2.82	666.89	325.26	11.28	2.82
BH-32	1.00	22.00	19.50	18.00	340.57	151.19	9.71	2.43	340.57	151.19	9.71	2.43
BH-32	1.00	23.50	21.00	19.50	362.41	168.13	10.06	2.51	362.41	168.13	10.06	2.51
BH-32	1.00	25.00	22.50	21.00	384.25	185.07	10.06	2.51	384.25	185.07	10.06	2.51
BH-32	1.00	26.50	24.00	22.50	406.09	202.00	10.06	2.51	406.09	202.00	10.06	2.51
BH-32	1.00	28.00	25.50	24.00	427.93	218.94	10.06	2.51	427.93	218.94	10.06	2.51

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-32	1.00	29.50	27.00	25.50	449.77	235.88	10.40	2.60	449.77	235.88	10.40	2.60
BH-32	1.00	30.00	27.50	26.00	457.05	241.52	10.40	2.60	457.05	241.52	10.40	2.60
BH-32	1.20	22.00	19.50	18.00	491.11	196.83	12.64	3.16	491.11	196.83	12.64	3.16
BH-32	1.20	23.50	21.00	19.50	520.78	219.97	13.09	3.27	520.78	219.97	13.09	3.27
BH-32	1.20	25.00	22.50	21.00	550.45	243.11	13.09	3.27	550.45	243.11	13.09	3.27
BH-32	1.20	26.50	24.00	22.50	580.11	266.25	13.09	3.27	580.11	266.25	13.09	3.27
BH-32	1.20	28.00	25.50	24.00	609.78	289.39	13.09	3.27	609.78	289.39	13.09	3.27
BH-32	1.20	29.50	27.00	25.50	639.44	312.53	13.53	3.38	639.44	312.53	13.53	3.38
BH-32	1.20	30.00	27.50	26.00	649.33	320.25	13.53	3.38	649.33	320.25	13.53	3.38
BH-33	1.00	22.00	19.50	18.00	320.78	144.62	9.36	2.34	320.78	144.62	9.36	2.34
BH-33	1.00	23.50	21.00	19.50	341.16	160.54	9.71	2.43	341.16	160.54	9.71	2.43
BH-33	1.00	25.00	22.50	21.00	361.55	176.46	9.71	2.43	361.55	176.46	9.71	2.43
BH-33	1.00	26.50	24.00	22.50	381.93	192.38	10.06	2.51	381.93	192.38	10.06	2.51
BH-33	1.00	28.00	25.50	24.00	402.31	208.29	10.40	2.60	402.31	208.29	10.40	2.60
BH-33	1.00	29.50	27.00	25.50	422.70	224.21	10.73	2.68	422.70	224.21	10.73	2.68
BH-33	1.00	30.00	27.50	26.00	429.49	229.52	10.73	2.68	429.49	229.52	10.73	2.68
BH-33	1.20	22.00	19.50	18.00	464.76	188.87	12.18	3.05	464.76	188.87	12.18	3.05
BH-33	1.20	23.50	21.00	19.50	492.67	210.79	12.64	3.16	492.67	210.79	12.64	3.16
BH-33	1.20	25.00	22.50	21.00	520.59	232.70	12.64	3.16	520.59	232.70	12.64	3.16
BH-33	1.20	26.50	24.00	22.50	548.51	254.62	13.09	3.27	548.51	254.62	13.09	3.27
BH-33	1.20	28.00	25.50	24.00	576.42	276.54	13.53	3.38	576.42	276.54	13.53	3.38
BH-33	1.20	29.50	27.00	25.50	604.34	298.45	13.97	3.49	604.34	298.45	13.97	3.49
BH-33	1.20	30.00	27.50	26.00	613.65	305.76	13.97	3.49	613.65	305.76	13.97	3.49
BH-34	1.00	22.00	19.50	16.50	345.85	152.28	11.80	2.95	345.85	152.28	11.80	2.95
BH-34	1.00	23.50	21.00	18.00	368.21	169.59	12.15	3.04	368.21	169.59	12.15	3.04

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-34	1.00	25.00	22.50	19.50	390.57	186.89	12.15	3.04	390.57	186.89	12.15	3.04
BH-34	1.00	26.50	24.00	21.00	412.93	204.19	12.15	3.04	412.93	204.19	12.15	3.04
BH-34	1.00	28.00	25.50	22.50	435.29	221.49	12.49	3.12	435.29	221.49	12.49	3.12
BH-34	1.00	29.50	27.00	24.00	457.65	238.79	12.49	3.12	457.65	238.79	12.49	3.12
BH-34	1.00	30.00	27.50	24.50	465.10	244.56	12.82	3.21	465.10	244.56	12.82	3.21
BH-34	1.20	22.00	19.50	16.50	455.00	188.55	15.33	3.83	455.00	188.55	15.33	3.83
BH-34	1.20	23.50	21.00	18.00	481.84	209.71	15.78	3.95	481.84	209.71	15.78	3.95
BH-34	1.20	25.00	22.50	19.50	508.67	230.86	15.78	3.95	508.67	230.86	15.78	3.95
BH-34	1.20	26.50	24.00	21.00	535.50	252.02	15.78	3.95	535.50	252.02	15.78	3.95
BH-34	1.20	28.00	25.50	22.50	562.34	273.18	16.23	4.06	562.34	273.18	16.23	4.06
BH-34	1.20	29.50	27.00	24.00	589.17	294.34	16.23	4.06	589.17	294.34	16.23	4.06
BH-34	1.20	30.00	27.50	24.50	598.11	301.39	16.66	4.17	598.11	301.39	16.66	4.17
BH-35	1.00	22.00	19.50	16.50	336.35	151.66	13.16	3.29	336.35	151.66	13.16	3.29
BH-35	1.00	23.50	21.00	18.00	357.51	168.12	13.48	3.37	357.51	168.12	13.48	3.37
BH-35	1.00	25.00	22.50	19.50	378.66	184.58	13.80	3.45	378.66	184.58	13.80	3.45
BH-35	1.00	26.50	24.00	21.00	399.82	201.04	13.80	3.45	399.82	201.04	13.80	3.45
BH-35	1.00	28.00	25.50	22.50	420.98	217.49	14.12	3.53	420.98	217.49	14.12	3.53
BH-35	1.00	29.50	27.00	24.00	442.13	233.95	14.12	3.53	442.13	233.95	14.12	3.53
BH-35	1.00	30.00	27.50	24.50	449.18	239.44	14.12	3.53	449.18	239.44	14.12	3.53
BH-35	1.20	22.00	19.50	16.50	487.12	197.89	17.09	4.27	487.12	197.89	17.09	4.27
BH-35	1.20	23.50	21.00	18.00	516.14	220.58	17.51	4.38	516.14	220.58	17.51	4.38
BH-35	1.20	25.00	22.50	19.50	545.16	243.27	17.93	4.48	545.16	243.27	17.93	4.48
BH-35	1.20	26.50	24.00	21.00	574.18	265.96	17.93	4.48	574.18	265.96	17.93	4.48
BH-35	1.20	28.00	25.50	22.50	603.21	288.65	18.34	4.59	603.21	288.65	18.34	4.59
BH-35	1.20	29.50	27.00	24.00	632.23	311.34	18.34	4.59	632.23	311.34	18.34	4.59

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-35	1.20	30.00	27.50	24.50	641.90	318.91	18.34	4.59	641.90	318.91	18.34	4.59
BH-36	1.00	20.50	18.00	18.00	300.18	135.87	10.16	2.54	300.18	135.87	10.16	2.54
BH-36	1.00	22.00	19.50	19.50	337.18	152.32	10.45	2.61	337.18	152.32	10.45	2.61
BH-36	1.00	23.50	21.00	21.00	358.32	168.76	10.45	2.61	358.32	168.76	10.45	2.61
BH-36	1.00	25.00	22.50	22.50	379.46	185.21	10.74	2.68	379.46	185.21	10.74	2.68
BH-36	1.00	26.50	24.00	24.00	400.61	201.66	11.02	2.76	400.61	201.66	11.02	2.76
BH-36	1.00	28.00	25.50	25.50	421.75	218.11	11.02	2.76	421.75	218.11	11.02	2.76
BH-36	1.00	29.50	27.00	27.00	442.89	234.56	11.30	2.83	442.89	234.56	11.30	2.83
BH-36	1.00	31.00	28.50	28.50	464.03	251.01	11.30	2.83	464.03	251.01	11.30	2.83
BH-36	1.00	32.50	30.00	30.00	485.17	267.45	11.30	2.83	485.17	267.45	11.30	2.83
BH-36	1.00	34.00	31.50	31.50	506.31	283.90	11.30	2.83	506.31	283.90	11.30	2.83
BH-36	1.00	35.00	32.50	32.50	520.41	294.87	11.30	2.83	520.41	294.87	11.30	2.83
BH-36	1.20	20.50	18.00	18.00	430.81	175.47	13.30	3.32	430.81	175.47	13.30	3.32
BH-36	1.20	22.00	19.50	19.50	485.62	198.02	13.68	3.42	485.62	198.02	13.68	3.42
BH-36	1.20	23.50	21.00	21.00	514.45	220.57	13.68	3.42	514.45	220.57	13.68	3.42
BH-36	1.20	25.00	22.50	22.50	543.27	243.13	14.06	3.51	543.27	243.13	14.06	3.51
BH-36	1.20	26.50	24.00	24.00	572.10	265.68	14.43	3.61	572.10	265.68	14.43	3.61
BH-36	1.20	28.00	25.50	25.50	600.93	288.23	14.43	3.61	600.93	288.23	14.43	3.61
BH-36	1.20	29.50	27.00	27.00	629.75	310.79	14.79	3.70	629.75	310.79	14.79	3.70
BH-36	1.20	31.00	28.50	28.50	658.58	333.34	14.79	3.70	658.58	333.34	14.79	3.70
BH-36	1.20	32.50	30.00	30.00	687.41	355.90	14.79	3.70	687.41	355.90	14.79	3.70
BH-36	1.20	34.00	31.50	31.50	716.23	378.45	14.79	3.70	716.23	378.45	14.79	3.70
BH-36	1.20	35.00	32.50	32.50	735.45	393.48	14.79	3.70	735.45	393.48	14.79	3.70
BH-37	1.00	20.50	18.00	18.00	234.28	125.43	8.93	2.23	234.28	125.43	8.93	2.23
BH-37	1.00	22.00	19.50	19.50	315.71	141.33	8.93	2.23	315.71	141.33	8.93	2.23

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-37	1.00	23.50	21.00	21.00	336.07	157.23	8.93	2.23	336.07	157.23	8.93	2.23
BH-37	1.00	25.00	22.50	22.50	356.42	173.13	8.93	2.23	356.42	173.13	8.93	2.23
BH-37	1.00	26.50	24.00	24.00	376.77	189.02	8.93	2.23	376.77	189.02	8.93	2.23
BH-37	1.00	28.00	25.50	25.50	397.13	204.92	9.25	2.31	397.13	204.92	9.25	2.31
BH-37	1.00	29.50	27.00	27.00	417.64	220.82	9.25	2.31	417.64	220.82	9.25	2.31
BH-37	1.00	31.00	28.50	28.50	437.99	236.71	9.25	2.31	437.99	236.71	9.25	2.31
BH-37	1.00	32.50	30.00	30.00	458.34	252.61	9.25	2.31	458.34	252.61	9.25	2.31
BH-37	1.00	34.00	31.50	31.50	478.70	268.51	9.25	2.31	478.70	268.51	9.25	2.31
BH-37	1.00	35.00	32.50	32.50	492.27	279.11	9.25	2.31	492.27	279.11	9.25	2.31
BH-37	1.20	20.50	18.00	18.00	325.12	161.39	11.70	2.93	325.12	161.39	11.70	2.93
BH-37	1.20	22.00	19.50	19.50	451.07	182.90	11.70	2.93	451.07	182.90	11.70	2.93
BH-37	1.20	23.50	21.00	21.00	478.42	204.42	11.70	2.93	478.42	204.42	11.70	2.93
BH-37	1.20	25.00	22.50	22.50	505.77	225.94	11.70	2.93	505.77	225.94	11.70	2.93
BH-37	1.20	26.50	24.00	24.00	533.11	247.46	11.70	2.93	533.11	247.46	11.70	2.93
BH-37	1.20	28.00	25.50	25.50	560.46	268.97	12.11	3.03	560.46	268.97	12.11	3.03
BH-37	1.20	29.50	27.00	27.00	588.07	290.49	12.11	3.03	588.07	290.49	12.11	3.03
BH-37	1.20	31.00	28.50	28.50	615.42	312.01	12.11	3.03	615.42	312.01	12.11	3.03
BH-37	1.20	32.50	30.00	30.00	642.77	333.53	12.11	3.03	642.77	333.53	12.11	3.03
BH-37	1.20	34.00	31.50	31.50	670.11	355.04	12.11	3.03	670.11	355.04	12.11	3.03
BH-37	1.20	35.00	32.50	32.50	688.34	369.39	12.11	3.03	688.34	369.39	12.11	3.03
BH-38	1.00	20.50	18.00	18.00	284.36	127.86	8.28	2.07	284.36	127.86	8.28	2.07
BH-38	1.00	22.00	19.50	19.50	288.13	142.90	8.28	2.07	288.13	142.90	8.28	2.07
BH-38	1.00	23.50	21.00	21.00	307.27	157.94	8.28	2.07	307.27	157.94	8.28	2.07
BH-38	1.00	25.00	22.50	22.50	326.40	172.99	8.28	2.07	326.40	172.99	8.28	2.07
BH-38	1.00	26.50	24.00	24.00	345.54	188.03	8.28	2.07	345.54	188.03	8.28	2.07

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-38	1.00	28.00	25.50	25.50	396.77	204.03	8.28	2.07	396.77	204.03	8.28	2.07
BH-38	1.00	29.50	27.00	27.00	417.27	220.04	8.61	2.15	417.27	220.04	8.61	2.15
BH-38	1.00	31.00	28.50	28.50	437.77	236.04	8.61	2.15	437.77	236.04	8.61	2.15
BH-38	1.00	32.50	30.00	30.00	458.58	252.04	8.61	2.15	458.58	252.04	8.61	2.15
BH-38	1.00	34.00	31.50	31.50	479.09	268.04	8.61	2.15	479.09	268.04	8.61	2.15
BH-38	1.00	35.00	32.50	32.50	492.76	278.71	8.61	2.15	492.76	278.71	8.61	2.15
BH-38	1.20	20.50	18.00	18.00	408.71	165.41	10.85	2.71	408.71	165.41	10.85	2.71
BH-38	1.20	22.00	19.50	19.50	409.63	186.01	10.85	2.71	409.63	186.01	10.85	2.71
BH-38	1.20	23.50	21.00	21.00	435.65	206.60	10.85	2.71	435.65	206.60	10.85	2.71
BH-38	1.20	25.00	22.50	22.50	461.67	227.19	10.85	2.71	461.67	227.19	10.85	2.71
BH-38	1.20	26.50	24.00	24.00	487.70	247.78	10.85	2.71	487.70	247.78	10.85	2.71
BH-38	1.20	28.00	25.50	25.50	565.78	269.67	10.85	2.71	565.78	269.67	10.85	2.71
BH-38	1.20	29.50	27.00	27.00	593.66	291.56	11.28	2.82	593.66	291.56	11.28	2.82
BH-38	1.20	31.00	28.50	28.50	621.54	313.45	11.28	2.82	621.54	313.45	11.28	2.82
BH-38	1.20	32.50	30.00	30.00	649.95	335.35	11.28	2.82	649.95	335.35	11.28	2.82
BH-38	1.20	34.00	31.50	31.50	677.83	357.24	11.28	2.82	677.83	357.24	11.28	2.82
BH-38	1.20	35.00	32.50	32.50	696.42	371.83	11.28	2.82	696.42	371.83	11.28	2.82
BH-39	1.00	20.50	18.00	18.00	314.31	138.00	9.86	2.46	314.31	138.00	9.86	2.46
BH-39	1.00	22.00	19.50	19.50	336.44	155.14	9.86	2.46	336.44	155.14	9.86	2.46
BH-39	1.00	23.50	21.00	21.00	358.57	172.28	9.86	2.46	358.57	172.28	9.86	2.46
BH-39	1.00	25.00	22.50	22.50	398.60	189.95	9.86	2.46	398.60	189.95	9.86	2.46
BH-39	1.00	26.50	24.00	24.00	421.65	207.63	9.86	2.46	421.65	207.63	9.86	2.46
BH-39	1.00	28.00	25.50	25.50	444.54	225.30	9.86	2.46	444.54	225.30	9.86	2.46
BH-39	1.00	29.50	27.00	27.00	467.44	242.98	9.86	2.46	467.44	242.98	9.86	2.46
BH-39	1.00	31.00	28.50	28.50	490.33	260.65	9.86	2.46	490.33	260.65	9.86	2.46

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-39	1.00	32.50	30.00	30.00	513.23	278.33	10.16	2.54	513.23	278.33	10.16	2.54
BH-39	1.00	34.00	31.50	31.50	536.12	296.00	10.16	2.54	536.12	296.00	10.16	2.54
BH-39	1.00	35.00	32.50	32.50	551.38	307.79	10.74	2.68	551.38	307.79	10.74	2.68
BH-39	1.20	20.50	18.00	18.00	323.10	154.19	12.91	3.23	323.10	154.19	12.91	3.23
BH-39	1.20	22.00	19.50	19.50	341.27	169.29	12.91	3.23	341.27	169.29	12.91	3.23
BH-39	1.20	23.50	21.00	21.00	359.45	184.39	12.91	3.23	359.45	184.39	12.91	3.23
BH-39	1.20	25.00	22.50	22.50	395.35	199.92	12.91	3.23	395.35	199.92	12.91	3.23
BH-39	1.20	26.50	24.00	24.00	414.42	215.46	12.91	3.23	414.42	215.46	12.91	3.23
BH-39	1.20	28.00	25.50	25.50	433.22	230.99	12.91	3.23	433.22	230.99	12.91	3.23
BH-39	1.20	29.50	27.00	27.00	452.02	246.53	12.91	3.23	452.02	246.53	12.91	3.23
BH-39	1.20	31.00	28.50	28.50	470.82	262.06	12.91	3.23	470.82	262.06	12.91	3.23
BH-39	1.20	32.50	30.00	30.00	489.62	277.60	13.30	3.32	489.62	277.60	13.30	3.32
BH-39	1.20	34.00	31.50	31.50	508.42	293.14	13.30	3.32	508.42	293.14	13.30	3.32
BH-39	1.20	35.00	32.50	32.50	520.95	303.49	14.06	3.51	520.95	303.49	14.06	3.51
BH-40	1.00	20.50	18.00	18.00	301.46	135.50	11.85	2.96	301.46	135.50	11.85	2.96
BH-40	1.00	22.00	19.50	19.50	322.17	151.64	12.12	3.03	322.17	151.64	12.12	3.03
BH-40	1.00	23.50	21.00	21.00	342.88	167.79	12.39	3.10	342.88	167.79	12.39	3.10
BH-40	1.00	25.00	22.50	22.50	363.59	183.94	12.39	3.10	363.59	183.94	12.39	3.10
BH-40	1.00	26.50	24.00	24.00	401.08	200.58	12.65	3.16	401.08	200.58	12.65	3.16
BH-40	1.00	28.00	25.50	25.50	422.51	217.23	12.65	3.16	422.51	217.23	12.65	3.16
BH-40	1.00	29.50	27.00	27.00	443.93	233.88	12.65	3.16	443.93	233.88	12.65	3.16
BH-40	1.00	31.00	28.50	28.50	465.35	250.52	12.65	3.16	465.35	250.52	12.65	3.16
BH-40	1.00	32.50	30.00	30.00	486.78	267.17	12.65	3.16	486.78	267.17	12.65	3.16
BH-40	1.00	34.00	31.50	31.50	508.20	283.81	12.65	3.16	508.20	283.81	12.65	3.16
BH-40	1.00	35.00	32.50	32.50	522.48	294.91	12.65	3.16	522.48	294.91	12.65	3.16

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-40	1.20	20.50	18.00	18.00	434.55	175.30	15.51	3.88	434.55	175.30	15.51	3.88
BH-40	1.20	22.00	19.50	19.50	462.92	197.53	15.86	3.96	462.92	197.53	15.86	3.96
BH-40	1.20	23.50	21.00	21.00	491.28	219.76	16.20	4.05	491.28	219.76	16.20	4.05
BH-40	1.20	25.00	22.50	22.50	519.65	241.99	16.20	4.05	519.65	241.99	16.20	4.05
BH-40	1.20	26.50	24.00	24.00	575.43	264.91	16.54	4.14	575.43	264.91	16.54	4.14
BH-40	1.20	28.00	25.50	25.50	604.77	287.83	16.54	4.14	604.77	287.83	16.54	4.14
BH-40	1.20	29.50	27.00	27.00	634.12	310.74	16.54	4.14	634.12	310.74	16.54	4.14
BH-40	1.20	31.00	28.50	28.50	663.46	333.66	16.54	4.14	663.46	333.66	16.54	4.14
BH-40	1.20	32.50	30.00	30.00	692.80	356.57	16.54	4.14	692.80	356.57	16.54	4.14
BH-40	1.20	34.00	31.50	31.50	722.15	379.49	16.54	4.14	722.15	379.49	16.54	4.14
BH-40	1.20	35.00	32.50	32.50	741.71	394.76	16.54	4.14	741.71	394.76	16.54	4.14

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-31	-
Chainage	3+643	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	216.00	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Ground Water Level from OGL	16.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-31	1.00	22.00	19.50	19.50	331.78	147.37	8.28	2.07
BH-31	1.00	23.50	21.00	21.00	353.17	164.00	8.28	2.07
BH-31	1.00	25.00	22.50	22.50	374.57	180.62	8.28	2.07
BH-31	1.00	26.50	24.00	24.00	395.96	197.25	8.28	2.07
BH-31	1.00	28.00	25.50	25.50	417.51	213.88	8.28	2.07
BH-31	1.00	29.50	27.00	27.00	438.91	230.50	8.61	2.15
BH-31	1.00	30.00	27.50	27.50	446.04	236.04	8.61	2.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	13.50	27.00	4.71	2.67	26.49	29.17	11.67	5.15
2	4.00	5.50	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	40.50	54.00	4.71	8.02	47.31	58.01	23.20	9.04
3	5.50	7.00	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	67.50	81.00	4.71	13.93	76.56	101.19	40.47	14.59
4	7.00	8.50	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	94.50	108.00	4.71	19.50	99.71	143.84	57.54	21.70
5	8.50	10.00	1.50	Granular	18.00	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	121.50	135.00	4.71	26.08	148.82	219.02	87.61	30.65
6	10.00	11.50	1.50	Granular	18.00	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	148.50	162.00	4.71	31.87	176.89	278.97	111.59	41.23
7	11.50	13.00	1.50	Granular	18.00	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	175.50	189.00	4.71	37.66	204.97	344.71	137.88	53.42
8	13.00	14.50	1.50	Granular	18.00	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	202.50	216.00	4.71	43.46	233.04	416.24	166.50	67.24
9	14.50	16.00	1.50	Granular	19.50	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	216.00	216.00	4.71	49.92	315.40	548.51	219.41	82.87
10	16.00	17.50	1.50	Granular	9.69	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	216.00	216.00	4.71	49.92	309.33	592.37	236.95	98.49
11	17.50	19.00	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	18.25	19.00	216.00	216.00	4.71	51.70	349.42	684.16	273.66	114.62
12	19.00	20.50	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	19.75	20.50	216.00	216.00	4.71	51.70	349.42	735.87	294.35	130.75
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	216.00	216.00	4.71	53.49	389.51	829.44	331.78	147.37
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	216.00	216.00	4.71	53.49	389.51	882.93	353.17	164.00
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	216.00	216.00	4.71	53.49	389.51	936.42	374.57	180.62
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	216.00	216.00	4.71	53.49	389.51	989.91	395.96	197.25
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	216.00	216.00	4.71	53.49	389.89	1043.78	417.51	213.88
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	216.00	216.00	4.71	53.49	389.89	1097.27	438.91	230.50
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	216.00	216.00	1.57	17.83	389.89	1115.09	446.04	236.04

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_t/T Ratio	L_t/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
2	22.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
3	24.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
4	25.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
5	27.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
6	28.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	30.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-31	-
Chainage	3+643	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	259.79	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	16.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-31	1.20	22.00	19.50	19.50	501.94	197.31	10.85	2.71
BH-31	1.20	23.50	21.00	21.00	532.82	221.30	10.85	2.71
BH-31	1.20	25.00	22.50	22.50	563.70	245.29	10.85	2.71
BH-31	1.20	26.50	24.00	24.00	594.58	269.28	10.85	2.71
BH-31	1.20	28.00	25.50	25.50	625.72	293.27	10.85	2.71
BH-31	1.20	29.50	27.00	27.00	656.60	317.26	11.28	2.82
BH-31	1.20	30.00	27.50	27.50	666.89	325.26	11.28	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	13.50	27.00	5.65	3.21	39.78	42.99	17.20	7.23
2	4.00	5.50	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	40.50	54.00	5.65	9.63	69.76	82.60	33.04	12.30
3	5.50	7.00	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	67.50	81.00	5.65	16.71	112.29	141.84	56.74	19.36
4	7.00	8.50	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	94.50	108.00	5.65	23.40	145.63	198.58	79.43	28.29
5	8.50	10.00	1.50	Granular	18.00	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	121.50	135.00	5.65	31.29	216.73	300.97	120.39	39.42
6	10.00	11.50	1.50	Granular	18.00	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	148.50	162.00	5.65	38.24	257.16	379.65	151.86	52.51
7	11.50	13.00	1.50	Granular	18.00	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	175.50	189.00	5.65	45.20	297.59	465.27	186.11	67.54
8	13.00	14.50	1.50	Granular	18.00	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	202.50	216.00	5.65	52.15	338.02	557.85	223.14	84.51
9	14.50	16.00	1.50	Granular	19.50	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	230.63	245.25	5.65	63.96	516.79	800.59	320.24	104.80
10	16.00	17.50	1.50	Granular	9.69	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	252.52	259.79	5.65	70.03	535.71	889.54	355.82	126.78
11	17.50	19.00	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	18.25	19.00	259.79	259.79	5.65	74.62	605.14	1033.60	413.44	150.05
12	19.00	20.50	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	19.75	20.50	259.79	259.79	5.65	74.62	605.14	1108.22	443.29	173.32
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	259.79	259.79	5.65	77.20	674.57	1254.85	501.94	197.31
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	259.79	259.79	5.65	77.20	674.57	1332.04	532.82	221.30
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	259.79	259.79	5.65	77.20	674.57	1409.24	563.70	245.29
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	259.79	259.79	5.65	77.20	674.57	1486.44	594.58	269.28
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	259.79	259.79	5.65	77.20	675.23	1564.30	625.72	293.27
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	259.79	259.79	5.65	77.20	675.23	1641.50	656.60	317.26
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	259.79	259.79	1.88	25.73	675.23	1667.23	666.89	325.26

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_e/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
2	22.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
3	24.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
4	25.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
5	27.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
6	28.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	30.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-32	-
Chainage	3+730	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	220.50	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	4.00	mtr
Ground Water Level from OGL	14.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-32	1.00	22.00	19.50	18.00	340.57	151.19	9.71	2.43
BH-32	1.00	23.50	21.00	19.50	362.41	168.13	10.06	2.51
BH-32	1.00	25.00	22.50	21.00	384.25	185.07	10.06	2.51
BH-32	1.00	26.50	24.00	22.50	406.09	202.00	10.06	2.51
BH-32	1.00	28.00	25.50	24.00	427.93	218.94	10.06	2.51
BH-32	1.00	29.50	27.00	25.50	449.77	235.88	10.40	2.60
BH-32	1.00	30.00	27.50	26.00	457.05	241.52	10.40	2.60

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	13.50	27.00	4.71	2.45	0.00	2.45	0.98	5.08
2	4.00	5.50	1.50	Granular	18.00	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	40.50	54.00	4.71	7.35	35.13	44.93	17.97	8.79
3	5.50	7.00	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	67.50	81.00	4.71	13.93	76.56	100.29	40.12	14.34
4	7.00	8.50	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	94.50	108.00	4.71	19.50	99.71	142.95	57.18	21.45
5	8.50	10.00	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	121.50	135.00	4.71	25.07	122.87	191.18	76.47	30.12
6	10.00	11.50	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	148.50	162.00	4.71	30.64	146.02	244.98	97.99	40.35
7	11.50	13.00	1.50	Granular	19.50	0.07	27	-	13.80	15.50	1.00	-	12.25	13.00	176.63	191.25	4.71	39.36	244.33	382.64	153.06	53.02
8	13.00	14.50	1.50	Granular	19.50	0.07	27	-	13.80	15.50	1.00	-	13.75	14.50	205.88	220.50	4.71	45.88	280.07	464.27	185.71	67.52
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	220.50	220.50	4.71	52.78	356.56	593.54	237.41	83.95
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	220.50	220.50	4.71	52.78	356.56	646.32	258.53	100.38
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	220.50	220.50	4.71	54.60	397.47	741.83	296.73	117.31
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	220.50	220.50	4.71	54.60	397.47	796.43	318.57	134.25
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	220.50	220.50	4.71	54.60	397.85	851.42	340.57	151.19
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	220.50	220.50	4.71	54.60	397.85	906.02	362.41	168.13
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	220.50	220.50	4.71	54.60	397.85	960.62	384.25	185.07
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	220.50	220.50	4.71	54.60	397.85	1015.22	406.09	202.00
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	220.50	220.50	4.71	54.60	397.85	1069.83	427.93	218.94
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	220.50	220.50	4.71	54.60	397.85	1124.43	449.77	235.88
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	220.50	220.50	1.57	18.20	397.85	1142.63	457.05	241.52

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_t/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.50	0.206	0.824	9.71	2.43	34.55	15.79	23.30	5.83	82.92	37.90
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
5	27.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
6	28.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
7	30.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-32	-
Chainage	3+730	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	249.58	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	4.00	mtr
Ground Water Level from OGL	14.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-32	1.20	22.00	19.50	18.00	491.11	196.83	12.64	3.16
BH-32	1.20	23.50	21.00	19.50	520.78	219.97	13.09	3.27
BH-32	1.20	25.00	22.50	21.00	550.45	243.11	13.09	3.27
BH-32	1.20	26.50	24.00	22.50	580.11	266.25	13.09	3.27
BH-32	1.20	28.00	25.50	24.00	609.78	289.39	13.09	3.27
BH-32	1.20	29.50	27.00	25.50	639.44	312.53	13.53	3.38
BH-32	1.20	30.00	27.50	26.00	649.33	320.25	13.53	3.38

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	13.50	27.00	5.65	2.94	0.00	2.94	1.18	7.16
2	4.00	5.50	1.50	Granular	18.00	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	40.50	54.00	5.65	8.83	51.40	63.17	25.27	12.00
3	5.50	7.00	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	67.50	81.00	5.65	16.71	112.29	140.77	56.31	19.06
4	7.00	8.50	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	94.50	108.00	5.65	23.40	145.63	197.51	79.01	27.99
5	8.50	10.00	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	121.50	135.00	5.65	30.09	178.97	260.94	104.38	38.79
6	10.00	11.50	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	148.50	162.00	5.65	36.77	212.32	331.06	132.42	51.46
7	11.50	13.00	1.50	Granular	19.50	0.07	27	-	13.80	15.50	1.00	-	12.25	13.00	176.63	191.25	5.65	47.24	354.88	520.86	208.34	67.06
8	13.00	14.50	1.50	Granular	19.50	0.07	27	-	13.80	15.50	1.00	-	13.75	14.50	205.88	220.50	5.65	55.06	406.36	627.39	250.96	84.85
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	227.77	235.04	5.65	65.43	548.60	835.06	334.02	105.54
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	242.31	249.58	5.65	69.60	581.81	937.88	375.15	127.41
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	249.58	249.58	5.65	74.16	648.56	1078.80	431.52	150.55
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	249.58	249.58	5.65	74.16	648.56	1152.96	461.18	173.69
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	249.58	249.58	5.65	74.16	649.23	1227.79	491.11	196.83
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	249.58	249.58	5.65	74.16	649.23	1301.95	520.78	219.97
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	249.58	249.58	5.65	74.16	649.23	1376.11	550.45	243.11
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	249.58	249.58	5.65	74.16	649.23	1450.28	580.11	266.25
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	249.58	249.58	5.65	74.16	649.23	1524.44	609.78	289.39
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	249.58	249.58	5.65	74.16	649.23	1598.61	639.44	312.53
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	249.58	249.58	1.88	24.72	649.23	1623.33	649.33	320.25

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_e/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.64	3.16	52.53	23.86	30.34	7.58	126.06	57.27
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
5	27.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
6	28.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
7	30.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-33	-
Chainage	3+792	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	205.79	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-33	1.00	22.00	19.50	18.00	320.78	144.62	9.36	2.34
BH-33	1.00	23.50	21.00	19.50	341.16	160.54	9.71	2.43
BH-33	1.00	25.00	22.50	21.00	361.55	176.46	9.71	2.43
BH-33	1.00	26.50	24.00	22.50	381.93	192.38	10.06	2.51
BH-33	1.00	28.00	25.50	24.00	402.31	208.29	10.40	2.60
BH-33	1.00	29.50	27.00	25.50	422.70	224.21	10.73	2.68
BH-33	1.00	30.00	27.50	26.00	429.49	229.52	10.73	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	13.50	27.00	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	40.50	54.00	4.71	8.02	47.31	55.33	22.13	8.29
3	5.50	7.00	1.50	Granular	18.00	0.00	26	-	11.90	13.19	1.00	-	6.25	7.00	67.50	81.00	4.71	14.49	92.67	115.18	46.07	14.00
4	7.00	8.50	1.50	Granular	18.00	0.00	26	-	11.90	13.19	1.00	-	7.75	8.50	94.50	108.00	4.71	20.28	120.74	163.53	65.41	21.33
5	8.50	10.00	1.50	Granular	18.00	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	121.50	135.00	4.71	25.07	122.87	190.73	76.29	30.00
6	10.00	11.50	1.50	Granular	18.00	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	148.50	162.00	4.71	30.64	146.02	244.53	97.81	40.23
7	11.50	13.00	1.50	Granular	19.50	0.03	27	-	13.80	15.50	1.00	-	12.25	13.00	176.63	191.25	4.71	39.36	244.33	382.20	152.88	52.90
8	13.00	14.50	1.50	Granular	9.69	0.03	27	-	13.80	15.50	1.00	-	13.75	14.50	198.52	205.79	4.71	44.24	256.76	438.87	175.55	66.94
9	14.50	16.00	1.50	Granular	9.69	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	205.79	205.79	4.71	47.56	294.99	524.66	209.87	81.90
10	16.00	17.50	1.50	Granular	9.69	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	205.79	205.79	4.71	47.56	294.99	572.23	228.89	96.87
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	205.79	205.79	4.71	50.96	371.83	700.03	280.01	112.79
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	205.79	205.79	4.71	50.96	371.83	750.99	300.39	128.70
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	205.79	205.79	4.71	50.96	371.83	801.95	320.78	144.62
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	205.79	205.79	4.71	50.96	371.83	852.91	341.16	160.54
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	205.79	205.79	4.71	50.96	371.83	903.87	361.55	176.46
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	205.79	205.79	4.71	50.96	371.83	954.83	381.93	192.38
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	205.79	205.79	4.71	50.96	371.83	1005.78	402.31	208.29
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	205.79	205.79	4.71	50.96	371.83	1056.74	422.70	224.21
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	205.79	205.79	1.57	16.99	371.83	1073.73	429.49	229.52

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.11	2.00	1.83	7.20	6.58	0.214	0.855	9.36	2.34	33.70	15.40	22.46	5.61	80.89	36.95
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.50	0.206	0.824	9.71	2.43	34.55	15.79	23.30	5.83	82.92	37.90
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.50	0.206	0.824	9.71	2.43	34.55	15.79	23.30	5.83	82.92	37.90
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
7	30.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-33	-
Chainage	3+792	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	234.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-33	1.20	22.00	19.50	18.00	464.76	188.87	12.18	3.05
BH-33	1.20	23.50	21.00	19.50	492.67	210.79	12.64	3.16
BH-33	1.20	25.00	22.50	21.00	520.59	232.70	12.64	3.16
BH-33	1.20	26.50	24.00	22.50	548.51	254.62	13.09	3.27
BH-33	1.20	28.00	25.50	24.00	576.42	276.54	13.53	3.38
BH-33	1.20	29.50	27.00	25.50	604.34	298.45	13.97	3.49
BH-33	1.20	30.00	27.50	26.00	613.65	305.76	13.97	3.49

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	13.50	27.00	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	40.50	54.00	5.65	9.63	69.76	79.39	31.76	11.40
3	5.50	7.00	1.50	Granular	18.00	0.00	26	-	11.90	13.19	1.00	-	6.25	7.00	67.50	81.00	5.65	17.38	135.87	162.88	65.15	18.65
4	7.00	8.50	1.50	Granular	18.00	0.00	26	-	11.90	13.19	1.00	-	7.75	8.50	94.50	108.00	5.65	24.34	176.30	227.65	91.06	27.84
5	8.50	10.00	1.50	Granular	18.00	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	121.50	135.00	5.65	30.09	178.97	260.41	104.16	38.64
6	10.00	11.50	1.50	Granular	18.00	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	148.50	162.00	5.65	36.77	212.32	330.52	132.21	51.31
7	11.50	13.00	1.50	Granular	19.50	0.03	27	-	13.80	15.50	1.00	-	12.25	13.00	176.63	191.25	5.65	47.24	354.88	520.33	208.13	66.91
8	13.00	14.50	1.50	Granular	9.69	0.03	27	-	13.80	15.50	1.00	-	13.75	14.50	198.52	205.79	5.65	53.09	371.25	589.79	235.92	84.15
9	14.50	16.00	1.50	Granular	9.69	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	213.06	220.33	5.65	59.09	455.91	733.54	293.42	103.07
10	16.00	17.50	1.50	Granular	9.69	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	227.60	234.87	5.65	63.12	485.32	826.07	330.43	123.12
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	234.87	234.87	5.65	69.79	611.76	1022.30	408.92	145.04
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	234.87	234.87	5.65	69.79	611.76	1092.10	436.84	166.95
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	234.87	234.87	5.65	69.79	611.76	1161.89	464.76	188.87
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	234.87	234.87	5.65	69.79	611.76	1231.68	492.67	210.79
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	234.87	234.87	5.65	69.79	611.76	1301.47	520.59	232.70
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	234.87	234.87	5.65	69.79	611.76	1371.27	548.51	254.62
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	234.87	234.87	5.65	69.79	611.76	1441.06	576.42	276.54
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	234.87	234.87	5.65	69.79	611.76	1510.85	604.34	298.45
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	234.87	234.87	1.88	23.26	611.76	1534.12	613.65	305.76

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.96	2.02	1.84	8.41	7.64	0.164	0.657	12.18	3.05	51.25	23.27	29.24	7.31	122.99	55.85
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.64	3.16	52.53	23.86	30.34	7.58	126.06	57.27
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.64	3.16	52.53	23.86	30.34	7.58	126.06	57.27
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
7	30.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-34	-
Chainage	3+883	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	225.75	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Level from OGL	14.65	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-34	1.00	22.00	19.50	16.50	345.85	152.28	11.80	2.95
BH-34	1.00	23.50	21.00	18.00	368.21	169.59	12.15	3.04
BH-34	1.00	25.00	22.50	19.50	390.57	186.89	12.15	3.04
BH-34	1.00	26.50	24.00	21.00	412.93	204.19	12.15	3.04
BH-34	1.00	28.00	25.50	22.50	435.29	221.49	12.49	3.12
BH-34	1.00	29.50	27.00	24.00	457.65	238.79	12.49	3.12
BH-34	1.00	30.00	27.50	24.50	465.10	244.56	12.82	3.21

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	18.00	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	38.25	51.75	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	18.00	0.04	24	-	8.00	9.78	1.00	-	6.25	7.00	65.25	78.75	4.71	12.93	66.39	79.32	31.73	11.32
4	7.00	8.50	1.50	Granular	18.00	0.04	24	-	8.00	9.78	1.00	-	7.75	8.50	92.25	105.75	4.71	18.27	87.21	118.41	47.37	18.08
5	8.50	10.00	1.50	Granular	20.00	0.00	27	-	13.80	15.50	1.00	-	9.25	10.00	120.75	135.75	4.71	26.91	176.77	234.89	93.95	27.27
6	10.00	11.50	1.50	Granular	20.00	0.00	27	-	13.80	15.50	1.00	-	10.75	11.50	150.75	165.75	4.71	33.60	213.43	305.14	122.06	38.32
7	11.50	13.00	1.50	Granular	20.00	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	180.75	195.75	4.71	43.27	324.44	459.41	183.77	52.09
8	13.00	14.50	1.50	Granular	20.00	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	210.75	225.75	4.71	50.45	372.03	557.46	222.98	67.86
9	14.50	16.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	225.75	225.75	4.71	54.04	364.89	604.35	241.74	84.64
10	16.00	17.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	225.75	225.75	4.71	54.04	364.89	658.39	263.35	101.42
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	225.75	225.75	4.71	54.04	365.23	712.77	285.11	118.20
12	19.00	20.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	225.75	225.75	4.71	54.04	365.23	766.81	306.72	134.98
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	225.75	225.75	4.71	55.90	407.14	864.62	345.85	152.28
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	225.75	225.75	4.71	55.90	407.14	920.52	368.21	169.59
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	225.75	225.75	4.71	55.90	407.14	976.42	390.57	186.89
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	225.75	225.75	4.71	55.90	407.14	1032.32	412.93	204.19
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	225.75	225.75	4.71	55.90	407.14	1088.22	435.29	221.49
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	225.75	225.75	4.71	55.90	407.14	1144.13	457.65	238.79
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	225.75	225.75	1.57	18.63	407.14	1162.76	465.10	244.56

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
7	30.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-34	-
Chainage	3+883	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	225.75	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Level from OGL	14.65	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-34	1.20	22.00	19.50	16.50	455.00	188.55	15.33	3.83
BH-34	1.20	23.50	21.00	18.00	481.84	209.71	15.78	3.95
BH-34	1.20	25.00	22.50	19.50	508.67	230.86	15.78	3.95
BH-34	1.20	26.50	24.00	21.00	535.50	252.02	15.78	3.95
BH-34	1.20	28.00	25.50	22.50	562.34	273.18	16.23	4.06
BH-34	1.20	29.50	27.00	24.00	589.17	294.34	16.23	4.06
BH-34	1.20	30.00	27.50	24.50	598.11	301.39	16.66	4.17

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	18.00	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	38.25	51.75	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	18.00	0.04	24	-	8.00	9.78	1.00	-	6.25	7.00	65.25	78.75	5.65	15.51	97.24	112.75	45.10	15.43
4	7.00	8.50	1.50	Granular	18.00	0.04	24	-	8.00	9.78	1.00	-	7.75	8.50	92.25	105.75	5.65	21.93	127.22	164.66	65.87	23.94
5	8.50	10.00	1.50	Granular	20.00	0.00	27	-	13.80	15.50	1.00	-	9.25	10.00	120.75	135.75	5.65	32.29	257.69	327.42	130.97	35.36
6	10.00	11.50	1.50	Granular	20.00	0.00	27	-	13.80	15.50	1.00	-	10.75	11.50	150.75	165.75	5.65	40.32	310.48	420.53	168.21	49.02
7	11.50	13.00	1.50	Granular	20.00	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	180.75	195.75	5.65	51.92	471.19	633.16	253.26	65.94
8	13.00	14.50	1.50	Granular	20.00	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	210.75	225.75	5.65	60.54	539.72	762.23	304.89	85.26
9	14.50	16.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	225.75	225.75	5.65	64.85	527.37	814.73	325.89	105.79
10	16.00	17.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	225.75	225.75	5.65	64.85	527.37	879.57	351.83	126.33
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	225.75	225.75	5.65	64.85	527.97	945.02	378.01	146.86
12	19.00	20.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	225.75	225.75	5.65	64.85	527.97	1009.87	403.95	167.39
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	225.75	225.75	5.65	67.08	588.53	1137.51	455.00	188.55
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	225.75	225.75	5.65	67.08	588.53	1204.59	481.84	209.71
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	225.75	225.75	5.65	67.08	588.53	1271.67	508.67	230.86
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	225.75	225.75	5.65	67.08	588.53	1338.76	535.50	252.02
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	225.75	225.75	5.65	67.08	588.53	1405.84	562.34	273.18
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	225.75	225.75	5.65	67.08	588.53	1472.92	589.17	294.34
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	225.75	225.75	1.88	22.36	588.53	1495.28	598.11	301.39

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
7	30.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-35	-
Chainage	4+014	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	213.59	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-35	1.00	22.00	19.50	16.50	336.35	151.66	13.16	3.29
BH-35	1.00	23.50	21.00	18.00	357.51	168.12	13.48	3.37
BH-35	1.00	25.00	22.50	19.50	378.66	184.58	13.80	3.45
BH-35	1.00	26.50	24.00	21.00	399.82	201.04	13.80	3.45
BH-35	1.00	28.00	25.50	22.50	420.98	217.49	14.12	3.53
BH-35	1.00	29.50	27.00	24.00	442.13	233.95	14.12	3.53
BH-35	1.00	30.00	27.50	24.50	449.18	239.44	14.12	3.53

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.10	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	38.48	51.30	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	19.50	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	65.93	80.55	4.71	14.15	92.90	107.05	42.82	11.66
4	7.00	8.50	1.50	Granular	19.50	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	95.18	109.80	4.71	20.43	123.32	157.89	63.16	19.03
5	8.50	10.00	1.50	Granular	19.50	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	124.43	139.05	4.71	29.78	234.13	298.49	119.40	29.02
6	10.00	11.50	1.50	Granular	19.50	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	153.68	168.30	4.71	36.79	280.54	381.68	152.67	40.97
7	11.50	13.00	1.50	Granular	20.00	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	183.30	198.30	4.71	43.88	328.48	473.50	189.40	54.90
8	13.00	14.50	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	205.95	213.59	4.71	49.30	345.94	540.26	216.10	70.35
9	14.50	16.00	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	213.59	213.59	4.71	51.13	345.94	591.39	236.55	86.32
10	16.00	17.50	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	213.59	213.59	4.71	51.13	345.94	642.51	257.01	102.28
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	213.59	213.59	4.71	52.89	385.63	735.09	294.04	118.74
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	213.59	213.59	4.71	52.89	385.63	787.98	315.19	135.20
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	213.59	213.59	4.71	52.89	385.63	840.87	336.35	151.66
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	213.59	213.59	4.71	52.89	385.63	893.77	357.51	168.12
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	213.59	213.59	4.71	52.89	385.63	946.66	378.66	184.58
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	213.59	213.59	4.71	52.89	385.63	999.55	399.82	201.04
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	213.59	213.59	4.71	52.89	385.63	1052.44	420.98	217.49
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	213.59	213.59	4.71	52.89	385.63	1105.33	442.13	233.95
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	213.59	213.59	1.57	17.63	385.63	1122.96	449.18	239.44

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21
2	22.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.68	1.95	1.81	6.38	5.94	0.148	0.593	13.48	3.37	42.99	20.00	32.35	8.09	103.19	48.01
3	24.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
4	25.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
5	27.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
6	28.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
7	30.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-35	-
Chainage	4+014	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	244.17	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	5.50	mtr
Ground Water Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-35	1.20	22.00	19.50	16.50	487.12	197.89	17.09	4.27
BH-35	1.20	23.50	21.00	18.00	516.14	220.58	17.51	4.38
BH-35	1.20	25.00	22.50	19.50	545.16	243.27	17.93	4.48
BH-35	1.20	26.50	24.00	21.00	574.18	265.96	17.93	4.48
BH-35	1.20	28.00	25.50	22.50	603.21	288.65	18.34	4.59
BH-35	1.20	29.50	27.00	24.00	632.23	311.34	18.34	4.59
BH-35	1.20	30.00	27.50	24.50	641.90	318.91	18.34	4.59

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.10	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	38.48	51.30	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	19.50	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	65.93	80.55	5.65	16.98	136.41	153.39	61.36	15.84
4	7.00	8.50	1.50	Granular	19.50	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	95.18	109.80	5.65	24.51	180.21	221.70	88.68	25.08
5	8.50	10.00	1.50	Granular	19.50	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	124.43	139.05	5.65	35.74	341.05	418.28	167.31	37.46
6	10.00	11.50	1.50	Granular	19.50	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	153.68	168.30	5.65	44.14	407.87	529.25	211.70	52.19
7	11.50	13.00	1.50	Granular	20.00	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	183.30	198.30	5.65	52.65	477.01	651.04	260.41	69.31
8	13.00	14.50	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	205.95	213.59	5.65	59.16	500.19	733.37	293.35	88.25
9	14.50	16.00	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	221.24	228.88	5.65	63.55	535.12	831.85	332.74	108.42
10	16.00	17.50	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	236.53	244.17	5.65	67.94	570.05	934.73	373.89	129.82
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	244.17	244.17	5.65	72.56	635.45	1072.68	429.07	152.51
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	244.17	244.17	5.65	72.56	635.45	1145.23	458.09	175.20
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	244.17	244.17	5.65	72.56	635.45	1217.79	487.12	197.89
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	244.17	244.17	5.65	72.56	635.45	1290.35	516.14	220.58
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	244.17	244.17	5.65	72.56	635.45	1362.90	545.16	243.27
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	244.17	244.17	5.65	72.56	635.45	1435.46	574.18	265.96
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	244.17	244.17	5.65	72.56	635.45	1508.01	603.21	288.65
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	244.17	244.17	5.65	72.56	635.45	1580.57	632.23	311.34
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	244.17	244.17	1.88	24.19	635.45	1604.76	641.90	318.91

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_t/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22
2	22.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.45	1.97	1.82	7.45	6.89	0.114	0.457	17.51	4.38	65.28	30.17	42.03	10.51	156.67	72.42
3	24.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
4	25.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
5	27.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
6	28.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
7	30.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-36	-
Chainage	4+093	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	213.44	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-36	1.00	20.50	18.00	18.00	300.18	135.87	10.16	2.54
BH-36	1.00	22.00	19.50	19.50	337.18	152.32	10.45	2.61
BH-36	1.00	23.50	21.00	21.00	358.32	168.76	10.45	2.61
BH-36	1.00	25.00	22.50	22.50	379.46	185.21	10.74	2.68
BH-36	1.00	26.50	24.00	24.00	400.61	201.66	11.02	2.76
BH-36	1.00	28.00	25.50	25.50	421.75	218.11	11.02	2.76
BH-36	1.00	29.50	27.00	27.00	442.89	234.56	11.30	2.83
BH-36	1.00	31.00	28.50	28.50	464.03	251.01	11.30	2.83
BH-36	1.00	32.50	30.00	30.00	485.17	267.45	11.30	2.83
BH-36	1.00	34.00	31.50	31.50	506.31	283.90	11.30	2.83
BH-36	1.00	35.00	32.50	32.50	520.41	294.87	11.30	2.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	19.00	0.04	24	-	8.00	9.78	1.00	-	3.25	4.00	14.25	28.50	4.71	2.82	27.97	30.79	12.32	5.19
2	4.00	5.50	1.50	Granular	19.00	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	42.75	57.00	4.71	8.47	49.94	61.23	24.49	9.21
3	5.50	7.00	1.50	Granular	19.00	0.00	27	-	13.80	15.50	1.00	-	6.25	7.00	71.25	85.50	4.71	15.88	114.82	141.99	56.80	15.30
4	7.00	8.50	1.50	Granular	18.70	0.00	27	-	13.80	15.50	1.00	-	7.75	8.50	99.53	113.55	4.71	22.18	148.94	198.29	79.32	23.16
5	8.50	10.00	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	127.58	141.60	4.71	27.38	156.01	232.74	93.10	32.48
6	10.00	11.50	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	155.63	169.65	4.71	33.40	185.18	295.31	118.12	43.48
7	11.50	13.00	1.50	Granular	19.50	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	184.28	198.90	4.71	42.59	291.38	444.10	177.64	57.06
8	13.00	14.50	1.50	Granular	9.69	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	206.17	213.44	4.71	47.65	305.73	506.10	202.44	72.05
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	213.44	213.44	4.71	51.09	345.35	596.82	238.73	88.00
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	213.44	213.44	4.71	51.09	345.35	647.91	259.16	103.96
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	213.44	213.44	4.71	51.09	345.70	699.35	279.74	119.91
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	213.44	213.44	4.71	51.09	345.70	750.44	300.18	135.87
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	213.44	213.44	4.71	52.85	385.36	842.95	337.18	152.32
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	213.44	213.44	4.71	52.85	385.36	895.81	358.32	168.76
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	213.44	213.44	4.71	52.85	385.36	948.66	379.46	185.21
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	213.44	213.44	4.71	52.85	385.36	1001.51	400.61	201.66
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	213.44	213.44	4.71	52.85	385.36	1054.37	421.75	218.11
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	213.44	213.44	4.71	52.85	385.36	1107.22	442.89	234.56
19	29.50	31.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	30.25	31.00	213.44	213.44	4.71	52.85	385.36	1160.08	464.03	251.01
20	31.00	32.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	31.75	32.50	213.44	213.44	4.71	52.85	385.36	1212.93	485.17	267.45
21	32.50	34.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	33.25	34.00	213.44	213.44	4.71	52.85	385.36	1265.78	506.31	283.90
22	34.00	35.00	1.00	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	34.50	35.00	213.44	213.44	3.14	35.24	385.36	1301.02	520.41	294.87

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
2	22.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
3	23.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
4	25.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
5	26.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
6	28.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
7	29.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	31.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	32.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	34.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	35.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-36	-
Chainage	4+093	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	242.52	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-36	1.20	20.50	18.00	18.00	430.81	175.47	13.30	3.32
BH-36	1.20	22.00	19.50	19.50	485.62	198.02	13.68	3.42
BH-36	1.20	23.50	21.00	21.00	514.45	220.57	13.68	3.42
BH-36	1.20	25.00	22.50	22.50	543.27	243.13	14.06	3.51
BH-36	1.20	26.50	24.00	24.00	572.10	265.68	14.43	3.61
BH-36	1.20	28.00	25.50	25.50	600.93	288.23	14.43	3.61
BH-36	1.20	29.50	27.00	27.00	629.75	310.79	14.79	3.70
BH-36	1.20	31.00	28.50	28.50	658.58	333.34	14.79	3.70
BH-36	1.20	32.50	30.00	30.00	687.41	355.90	14.79	3.70
BH-36	1.20	34.00	31.50	31.50	716.23	378.45	14.79	3.70
BH-36	1.20	35.00	32.50	32.50	735.45	393.48	14.79	3.70

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	19.00	0.04	24	-	8.00	9.78	1.00	-	3.25	4.00	14.25	28.50	5.65	3.39	42.00	45.38	18.15	7.28
2	4.00	5.50	1.50	Granular	19.00	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	42.75	57.00	5.65	10.16	73.64	87.19	34.88	12.50
3	5.50	7.00	1.50	Granular	19.00	0.00	27	-	13.80	15.50	1.00	-	6.25	7.00	71.25	85.50	5.65	19.06	168.32	200.92	80.37	20.21
4	7.00	8.50	1.50	Granular	18.70	0.00	27	-	13.80	15.50	1.00	-	7.75	8.50	99.53	113.55	5.65	26.62	217.40	276.62	110.65	30.04
5	8.50	10.00	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	127.58	141.60	5.65	32.85	227.18	319.26	127.70	41.62
6	10.00	11.50	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	155.63	169.65	5.65	40.08	269.18	401.34	160.53	55.21
7	11.50	13.00	1.50	Granular	19.50	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	184.28	198.90	5.65	51.11	423.06	606.33	242.53	71.90
8	13.00	14.50	1.50	Granular	9.69	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	206.17	213.44	5.65	57.18	441.98	682.42	272.97	90.28
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	220.71	227.98	5.65	63.40	532.47	836.31	334.52	110.41
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	235.25	242.52	5.65	67.58	565.68	937.10	374.84	131.71
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	242.52	242.52	5.65	69.66	566.28	1007.36	402.95	153.59
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	242.52	242.52	5.65	69.66	566.28	1077.03	430.81	175.47
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	242.52	242.52	5.65	72.07	631.25	1214.06	485.62	198.02
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	242.52	242.52	5.65	72.07	631.25	1286.12	514.45	220.57
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	242.52	242.52	5.65	72.07	631.25	1358.19	543.27	243.13
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	242.52	242.52	5.65	72.07	631.25	1430.25	572.10	265.68
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	242.52	242.52	5.65	72.07	631.25	1502.32	600.93	288.23
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	242.52	242.52	5.65	72.07	631.25	1574.38	629.75	310.79
19	29.50	31.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	30.25	31.00	242.52	242.52	5.65	72.07	631.25	1646.45	658.58	333.34
20	31.00	32.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	31.75	32.50	242.52	242.52	5.65	72.07	631.25	1718.52	687.41	355.90
21	32.50	34.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	33.25	34.00	242.52	242.52	5.65	72.07	631.25	1790.58	716.23	378.45
22	34.00	35.00	1.00	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	34.50	35.00	242.52	242.52	3.77	48.04	631.25	1838.63	735.45	393.48

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
2	22.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
3	23.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
4	25.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
5	26.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
6	28.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
7	29.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	31.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	32.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	34.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	35.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-37	-
Chainage	4+210	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	205.49	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	14.30	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-37	1.00	20.50	18.00	18.00	234.28	125.43	8.93	2.23
BH-37	1.00	22.00	19.50	19.50	315.71	141.33	8.93	2.23
BH-37	1.00	23.50	21.00	21.00	336.07	157.23	8.93	2.23
BH-37	1.00	25.00	22.50	22.50	356.42	173.13	8.93	2.23
BH-37	1.00	26.50	24.00	24.00	376.77	189.02	8.93	2.23
BH-37	1.00	28.00	25.50	25.50	397.13	204.92	9.25	2.31
BH-37	1.00	29.50	27.00	27.00	417.64	220.82	9.25	2.31
BH-37	1.00	31.00	28.50	28.50	437.99	236.71	9.25	2.31
BH-37	1.00	32.50	30.00	30.00	458.34	252.61	9.25	2.31
BH-37	1.00	34.00	31.50	31.50	478.70	268.51	9.25	2.31
BH-37	1.00	35.00	32.50	32.50	492.27	279.11	9.25	2.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	13.50	27.00	4.71	2.56	22.74	25.30	10.12	5.12
2	4.00	5.50	1.50	Granular	18.00	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	40.50	54.00	4.71	7.69	41.22	51.47	20.59	8.92
3	5.50	7.00	1.50	Granular	18.00	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	67.50	81.00	4.71	15.04	108.78	134.07	53.63	14.78
4	7.00	8.50	1.50	Granular	18.70	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	95.03	109.05	4.71	21.18	143.44	189.91	75.96	22.36
5	8.50	10.00	1.50	Granular	18.70	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	123.08	137.10	4.71	25.40	124.95	196.82	78.73	31.12
6	10.00	11.50	1.50	Granular	18.70	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	151.13	165.15	4.71	31.19	149.00	252.06	100.82	41.50
7	11.50	13.00	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	12.25	13.00	179.18	193.20	4.71	38.45	209.66	351.17	140.47	53.92
8	13.00	14.50	1.50	Granular	8.19	0.07	26	-	11.90	13.19	1.00	-	13.75	14.50	199.35	205.49	4.71	42.78	217.52	401.81	160.72	67.54
9	14.50	16.00	1.50	Granular	8.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	205.49	205.49	4.71	47.49	293.64	525.42	210.17	82.49
10	16.00	17.50	1.50	Granular	8.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	205.49	205.49	4.71	47.49	293.64	572.92	229.17	97.44
11	17.50	19.00	1.50	Granular	8.19	0.00	26	-	11.90	13.19	1.00	-	18.25	19.00	205.49	205.49	4.71	44.10	217.52	540.89	216.36	111.44
12	19.00	20.50	1.50	Granular	9.69	0.00	26	-	11.90	13.19	1.00	-	19.75	20.50	205.49	205.49	4.71	44.10	218.22	585.70	234.28	125.43
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	205.49	205.49	4.71	50.89	370.92	789.28	315.71	141.33
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	205.49	205.49	4.71	50.89	370.92	840.16	336.07	157.23
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	205.49	205.49	4.71	50.89	370.92	891.05	356.42	173.13
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	205.49	205.49	4.71	50.89	370.92	941.93	376.77	189.02
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	205.49	205.49	4.71	50.89	370.92	992.82	397.13	204.92
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	205.49	205.49	4.71	50.89	371.30	1044.09	417.64	220.82
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	205.49	205.49	4.71	50.89	371.30	1094.97	437.99	236.71
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	205.49	205.49	4.71	50.89	371.30	1145.86	458.34	252.61
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	205.49	205.49	4.71	50.89	371.30	1196.74	478.70	268.51
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	205.49	205.49	3.14	33.92	371.30	1230.67	492.27	279.11

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
2	22.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
3	23.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
4	25.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
5	26.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
6	28.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	29.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	31.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	32.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	34.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	35.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-37	-
Chainage	4+210	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	230.07	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Ground Water Level from OGL	14.30	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-37	1.20	20.50	18.00	18.00	325.12	161.39	11.70	2.93
BH-37	1.20	22.00	19.50	19.50	451.07	182.90	11.70	2.93
BH-37	1.20	23.50	21.00	21.00	478.42	204.42	11.70	2.93
BH-37	1.20	25.00	22.50	22.50	505.77	225.94	11.70	2.93
BH-37	1.20	26.50	24.00	24.00	533.11	247.46	11.70	2.93
BH-37	1.20	28.00	25.50	25.50	560.46	268.97	12.11	3.03
BH-37	1.20	29.50	27.00	27.00	588.07	290.49	12.11	3.03
BH-37	1.20	31.00	28.50	28.50	615.42	312.01	12.11	3.03
BH-37	1.20	32.50	30.00	30.00	642.77	333.53	12.11	3.03
BH-37	1.20	34.00	31.50	31.50	670.11	355.04	12.11	3.03
BH-37	1.20	35.00	32.50	32.50	688.34	369.39	12.11	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	13.50	27.00	5.65	3.08	33.97	37.04	14.82	7.19
2	4.00	5.50	1.50	Granular	18.00	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	40.50	54.00	5.65	9.23	60.58	72.88	29.15	12.15
3	5.50	7.00	1.50	Granular	18.00	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	67.50	81.00	5.65	18.05	159.46	189.81	75.93	19.58
4	7.00	8.50	1.50	Granular	18.70	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	95.03	109.05	5.65	25.41	209.48	265.25	106.10	29.07
5	8.50	10.00	1.50	Granular	18.70	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	123.08	137.10	5.65	30.48	182.04	268.29	107.32	39.98
6	10.00	11.50	1.50	Granular	18.70	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	151.13	165.15	5.65	37.42	216.68	340.35	136.14	52.84
7	11.50	13.00	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	12.25	13.00	179.18	193.20	5.65	46.14	304.44	474.25	189.70	68.13
8	13.00	14.50	1.50	Granular	8.19	0.07	26	-	11.90	13.19	1.00	-	13.75	14.50	199.35	205.49	5.65	51.34	314.33	535.48	214.19	84.88
9	14.50	16.00	1.50	Granular	8.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	211.64	217.78	5.65	58.70	449.15	729.00	291.60	103.69
10	16.00	17.50	1.50	Granular	8.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	223.93	230.07	5.65	62.10	474.01	815.96	326.38	123.45
11	17.50	19.00	1.50	Granular	8.19	0.00	26	-	11.90	13.19	1.00	-	18.25	19.00	230.07	230.07	5.65	59.25	351.14	752.34	300.93	142.42
12	19.00	20.50	1.50	Granular	9.69	0.00	26	-	11.90	13.19	1.00	-	19.75	20.50	230.07	230.07	5.65	59.25	352.35	812.80	325.12	161.39
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	230.07	230.07	5.65	68.37	598.87	1127.69	451.07	182.90
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	230.07	230.07	5.65	68.37	598.87	1196.05	478.42	204.42
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	230.07	230.07	5.65	68.37	598.87	1264.42	505.77	225.94
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	230.07	230.07	5.65	68.37	598.87	1332.79	533.11	247.46
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	230.07	230.07	5.65	68.37	598.87	1401.15	560.46	268.97
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	230.07	230.07	5.65	68.37	599.53	1470.18	588.07	290.49
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	230.07	230.07	5.65	68.37	599.53	1538.55	615.42	312.01
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	230.07	230.07	5.65	68.37	599.53	1606.91	642.77	333.53
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	230.07	230.07	5.65	68.37	599.53	1675.28	670.11	355.04
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	230.07	230.07	3.77	45.58	599.53	1720.86	688.34	369.39

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
2	22.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
3	23.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
4	25.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
5	26.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
6	28.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	29.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	31.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	32.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	34.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	35.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-38	-
Chainage	4+334	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	206.99	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	13.75	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-38	1.00	20.50	18.00	18.00	284.36	127.86	8.28	2.07
BH-38	1.00	22.00	19.50	19.50	288.13	142.90	8.28	2.07
BH-38	1.00	23.50	21.00	21.00	307.27	157.94	8.28	2.07
BH-38	1.00	25.00	22.50	22.50	326.40	172.99	8.28	2.07
BH-38	1.00	26.50	24.00	24.00	345.54	188.03	8.28	2.07
BH-38	1.00	28.00	25.50	25.50	396.77	204.03	8.28	2.07
BH-38	1.00	29.50	27.00	27.00	417.27	220.04	8.61	2.15
BH-38	1.00	31.00	28.50	28.50	437.77	236.04	8.61	2.15
BH-38	1.00	32.50	30.00	30.00	458.58	252.04	8.61	2.15
BH-38	1.00	34.00	31.50	31.50	479.09	268.04	8.61	2.15
BH-38	1.00	35.00	32.50	32.50	492.76	278.71	8.61	2.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	13.50	27.00	4.71	2.67	26.49	29.17	11.67	5.15
2	4.00	5.50	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	40.50	54.00	4.71	8.02	47.31	58.01	23.20	9.04
3	5.50	7.00	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	67.50	81.00	4.71	13.93	76.56	101.19	40.47	14.59
4	7.00	8.50	1.50	Granular	18.70	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	95.03	109.05	4.71	19.61	100.89	145.13	58.05	21.73
5	8.50	10.00	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	123.08	137.10	4.71	26.41	151.33	221.98	88.79	30.78
6	10.00	11.50	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	151.13	165.15	4.71	32.43	180.50	283.58	113.43	41.51
7	11.50	13.00	1.50	Granular	18.70	0.07	25	-	10.00	10.88	1.00	-	12.25	13.00	179.18	193.20	4.71	36.97	173.06	313.11	125.24	53.51
8	13.00	14.50	1.50	Granular	9.19	0.07	25	-	10.00	10.88	1.00	-	13.75	14.50	200.10	206.99	4.71	41.29	181.14	362.48	144.99	66.72
9	14.50	16.00	1.50	Granular	9.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	206.99	206.99	4.71	47.84	296.37	525.55	210.22	81.77
10	16.00	17.50	1.50	Granular	9.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	206.99	206.99	4.71	47.84	296.37	573.39	229.36	96.81
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	206.99	206.99	4.71	49.55	334.77	661.35	264.54	112.33
12	19.00	20.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	206.99	206.99	4.71	49.55	334.77	710.90	284.36	127.86
13	20.50	22.00	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	21.25	22.00	206.99	206.99	4.71	47.84	296.37	720.33	288.13	142.90
14	22.00	23.50	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	22.75	23.50	206.99	206.99	4.71	47.84	296.37	768.17	307.27	157.94
15	23.50	25.00	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	24.25	25.00	206.99	206.99	4.71	47.84	296.37	816.01	326.40	172.99
16	25.00	26.50	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	25.75	26.50	206.99	206.99	4.71	47.84	296.37	863.85	345.54	188.03
17	26.50	28.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	206.99	206.99	4.71	51.26	373.18	991.92	396.77	204.03
18	28.00	29.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	206.99	206.99	4.71	51.26	373.18	1043.18	417.27	220.04
19	29.50	31.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	206.99	206.99	4.71	51.26	373.18	1094.43	437.77	236.04
20	31.00	32.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	206.99	206.99	4.71	51.26	373.95	1146.46	458.58	252.04
21	32.50	34.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	206.99	206.99	4.71	51.26	373.95	1197.72	479.09	268.04
22	34.00	35.00	1.00	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	206.99	206.99	3.14	34.17	373.95	1231.89	492.76	278.71

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
2	22.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
3	23.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
4	25.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
5	26.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
6	28.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
7	29.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	31.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	32.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	34.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	35.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-38	-
Chainage	4+334	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	234.57	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	13.75	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-38	1.20	20.50	18.00	18.00	408.71	165.41	10.85	2.71
BH-38	1.20	22.00	19.50	19.50	409.63	186.01	10.85	2.71
BH-38	1.20	23.50	21.00	21.00	435.65	206.60	10.85	2.71
BH-38	1.20	25.00	22.50	22.50	461.67	227.19	10.85	2.71
BH-38	1.20	26.50	24.00	24.00	487.70	247.78	10.85	2.71
BH-38	1.20	28.00	25.50	25.50	565.78	269.67	10.85	2.71
BH-38	1.20	29.50	27.00	27.00	593.66	291.56	11.28	2.82
BH-38	1.20	31.00	28.50	28.50	621.54	313.45	11.28	2.82
BH-38	1.20	32.50	30.00	30.00	649.95	335.35	11.28	2.82
BH-38	1.20	34.00	31.50	31.50	677.83	357.24	11.28	2.82
BH-38	1.20	35.00	32.50	32.50	696.42	371.83	11.28	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	13.50	27.00	5.65	3.21	39.78	42.99	17.20	7.23
2	4.00	5.50	1.50	Granular	18.00	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	40.50	54.00	5.65	9.63	69.76	82.60	33.04	12.30
3	5.50	7.00	1.50	Granular	18.00	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	67.50	81.00	5.65	16.71	112.29	141.84	56.74	19.36
4	7.00	8.50	1.50	Granular	18.70	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	95.03	109.05	5.65	23.53	147.40	200.49	80.19	28.32
5	8.50	10.00	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	123.08	137.10	5.65	31.70	220.44	305.22	122.09	39.57
6	10.00	11.50	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	151.13	165.15	5.65	38.92	262.44	386.14	154.46	52.84
7	11.50	13.00	1.50	Granular	18.70	0.07	25	-	10.00	10.88	1.00	-	12.25	13.00	179.18	193.20	5.65	44.37	251.32	419.39	167.76	67.64
8	13.00	14.50	1.50	Granular	9.19	0.07	25	-	10.00	10.88	1.00	-	13.75	14.50	200.10	206.99	5.65	49.55	261.88	479.50	191.80	83.89
9	14.50	16.00	1.50	Granular	9.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	213.89	220.78	5.65	59.32	456.29	733.23	293.29	102.88
10	16.00	17.50	1.50	Granular	9.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	227.68	234.57	5.65	63.14	484.18	824.26	329.70	122.93
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	234.57	234.57	5.65	67.38	546.92	954.38	381.75	144.17
12	19.00	20.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	234.57	234.57	5.65	67.38	546.92	1021.76	408.71	165.41
13	20.50	22.00	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	21.25	22.00	234.57	234.57	5.65	65.06	484.18	1024.07	409.63	186.01
14	22.00	23.50	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	22.75	23.50	234.57	234.57	5.65	65.06	484.18	1089.13	435.65	206.60
15	23.50	25.00	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	24.25	25.00	234.57	234.57	5.65	65.06	484.18	1154.19	461.67	227.19
16	25.00	26.50	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	25.75	26.50	234.57	234.57	5.65	65.06	484.18	1219.24	487.70	247.78
17	26.50	28.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	234.57	234.57	5.65	69.70	609.67	1414.44	565.78	269.67
18	28.00	29.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	234.57	234.57	5.65	69.70	609.67	1484.14	593.66	291.56
19	29.50	31.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	234.57	234.57	5.65	69.70	609.67	1553.85	621.54	313.45
20	31.00	32.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	234.57	234.57	5.65	69.70	611.00	1624.88	649.95	335.35
21	32.50	34.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	234.57	234.57	5.65	69.70	611.00	1694.58	677.83	357.24
22	34.00	35.00	1.00	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	234.57	234.57	3.77	46.47	611.00	1741.05	696.42	371.83

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
2	22.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
3	23.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
4	25.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
5	26.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
6	28.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
7	29.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	31.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	32.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	34.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	35.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-39	-
Chainage	4+425	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	231.14	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	15.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-39	1.00	20.50	18.00	18.00	314.31	138.00	9.86	2.46
BH-39	1.00	22.00	19.50	19.50	336.44	155.14	9.86	2.46
BH-39	1.00	23.50	21.00	21.00	358.57	172.28	9.86	2.46
BH-39	1.00	25.00	22.50	22.50	398.60	189.95	9.86	2.46
BH-39	1.00	26.50	24.00	24.00	421.65	207.63	9.86	2.46
BH-39	1.00	28.00	25.50	25.50	444.54	225.30	9.86	2.46
BH-39	1.00	29.50	27.00	27.00	467.44	242.98	9.86	2.46
BH-39	1.00	31.00	28.50	28.50	490.33	260.65	9.86	2.46
BH-39	1.00	32.50	30.00	30.00	513.23	278.33	10.16	2.54
BH-39	1.00	34.00	31.50	31.50	536.12	296.00	10.16	2.54
BH-39	1.00	35.00	32.50	32.50	551.38	307.79	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.53	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	13.90	27.80	4.71	2.64	23.41	26.05	10.42	5.14
2	4.00	5.50	1.50	Granular	18.53	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	41.69	55.59	4.71	7.92	42.43	52.99	21.19	9.00
3	5.50	7.00	1.50	Granular	18.53	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	69.49	83.39	4.71	12.62	52.78	75.95	30.38	14.19
4	7.00	8.50	1.50	Granular	19.50	0.02	22	-	4.00	7.59	1.00	-	7.75	8.50	98.01	112.64	4.71	17.80	70.42	111.39	44.56	20.82
5	8.50	10.00	1.50	Granular	19.50	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	127.26	141.89	4.71	27.31	156.68	224.96	89.99	30.11
6	10.00	11.50	1.50	Granular	19.50	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	156.51	171.14	4.71	33.59	187.10	288.97	115.59	41.17
7	11.50	13.00	1.50	Granular	20.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	186.14	201.14	4.71	43.02	294.83	439.72	175.89	54.86
8	13.00	14.50	1.50	Granular	20.00	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	216.14	231.14	4.71	49.95	336.96	531.80	212.72	70.50
9	14.50	16.00	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	231.14	231.14	4.71	53.42	330.89	579.15	231.66	87.11
10	16.00	17.50	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	231.14	231.14	4.71	53.42	330.89	632.57	253.03	103.71
11	17.50	19.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	231.14	231.14	4.71	55.33	373.43	730.44	292.18	120.85
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	231.14	231.14	4.71	55.33	373.43	785.77	314.31	138.00
13	20.50	22.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	231.14	231.14	4.71	55.33	373.43	841.09	336.44	155.14
14	22.00	23.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	231.14	231.14	4.71	55.33	373.43	896.42	358.57	172.28
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	231.14	231.14	4.71	57.24	416.28	996.51	398.60	189.95
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	231.14	231.14	4.71	57.24	416.66	1054.13	421.65	207.63
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	231.14	231.14	4.71	57.24	416.66	1111.36	444.54	225.30
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	231.14	231.14	4.71	57.24	416.66	1168.60	467.44	242.98
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	231.14	231.14	4.71	57.24	416.66	1225.83	490.33	260.65
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	231.14	231.14	4.71	57.24	416.66	1283.07	513.23	278.33
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	231.14	231.14	4.71	57.24	416.66	1340.30	536.12	296.00
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	231.14	231.14	3.14	38.16	416.66	1378.46	551.38	307.79

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
2	22.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
3	23.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
4	25.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
5	26.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
6	28.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
7	29.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
7	31.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
7	32.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
7	34.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
7	35.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-39	-
Chainage	4+425	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	238.78	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	15.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-39	1.20	20.50	18.00	18.00	323.10	154.19	12.91	3.23
BH-39	1.20	22.00	19.50	19.50	341.27	169.29	12.91	3.23
BH-39	1.20	23.50	21.00	21.00	359.45	184.39	12.91	3.23
BH-39	1.20	25.00	22.50	22.50	395.35	199.92	12.91	3.23
BH-39	1.20	26.50	24.00	24.00	414.42	215.46	12.91	3.23
BH-39	1.20	28.00	25.50	25.50	433.22	230.99	12.91	3.23
BH-39	1.20	29.50	27.00	27.00	452.02	246.53	12.91	3.23
BH-39	1.20	31.00	28.50	28.50	470.82	262.06	12.91	3.23
BH-39	1.20	32.50	30.00	30.00	489.62	277.60	13.30	3.32
BH-39	1.20	34.00	31.50	31.50	508.42	293.14	13.30	3.32
BH-39	1.20	35.00	32.50	32.50	520.95	303.49	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.53	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	13.90	27.80	5.65	3.17	34.97	38.13	15.25	7.22
2	4.00	5.50	1.50	Granular	18.53	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	41.69	55.59	5.65	9.50	62.37	75.03	30.01	12.25
3	5.50	7.00	1.50	Granular	18.53	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	69.49	83.39	5.65	15.14	76.85	104.65	41.86	18.87
4	7.00	8.50	1.50	Granular	19.50	0.02	22	-	4.00	7.59	1.00	-	7.75	8.50	98.01	112.64	5.65	21.36	102.30	151.46	60.58	27.22
5	8.50	10.00	1.50	Granular	19.50	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	127.26	141.89	5.65	32.77	228.25	310.19	124.08	38.78
6	10.00	11.50	1.50	Granular	19.50	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	156.51	171.14	5.65	40.31	272.05	394.30	157.72	52.44
7	11.50	13.00	1.50	Granular	20.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	186.14	201.14	5.65	51.62	428.12	601.99	240.79	69.27
8	13.00	14.50	1.50	Granular	20.00	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	216.14	231.14	5.65	59.94	488.78	722.60	289.04	88.43
9	14.50	16.00	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	238.78	246.43	5.65	66.22	509.22	809.25	323.70	109.34
10	16.00	17.50	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	158.17	158.17	5.65	43.87	330.75	674.65	269.86	124.00
11	17.50	19.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	158.17	158.17	5.65	45.43	372.98	762.31	304.93	139.10
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	158.17	158.17	5.65	45.43	372.98	807.75	323.10	154.19
13	20.50	22.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	158.17	158.17	5.65	45.43	372.98	853.18	341.27	169.29
14	22.00	23.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	158.17	158.17	5.65	45.43	372.98	898.62	359.45	184.39
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	158.17	158.17	5.65	47.00	415.74	988.38	395.35	199.92
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	158.17	158.17	5.65	47.00	416.40	1036.04	414.42	215.46
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	158.17	158.17	5.65	47.00	416.40	1083.04	433.22	230.99
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	158.17	158.17	5.65	47.00	416.40	1130.05	452.02	246.53
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	158.17	158.17	5.65	47.00	416.40	1177.05	470.82	262.06
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	158.17	158.17	5.65	47.00	416.40	1224.05	489.62	277.60
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	158.17	158.17	5.65	47.00	416.40	1271.05	508.42	293.14
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	158.17	158.17	3.77	31.33	416.40	1302.38	520.95	303.49

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
2	22.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
3	23.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
4	25.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
5	26.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
6	28.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
7	29.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
7	31.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
7	32.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
7	34.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
7	35.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-40	-
Chainage	4+518	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	216.29	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	13.70	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-40	1.00	20.50	18.00	18.00	301.46	135.50	11.85	2.96
BH-40	1.00	22.00	19.50	19.50	322.17	151.64	12.12	3.03
BH-40	1.00	23.50	21.00	21.00	342.88	167.79	12.39	3.10
BH-40	1.00	25.00	22.50	22.50	363.59	183.94	12.39	3.10
BH-40	1.00	26.50	24.00	24.00	401.08	200.58	12.65	3.16
BH-40	1.00	28.00	25.50	25.50	422.51	217.23	12.65	3.16
BH-40	1.00	29.50	27.00	27.00	443.93	233.88	12.65	3.16
BH-40	1.00	31.00	28.50	28.50	465.35	250.52	12.65	3.16
BH-40	1.00	32.50	30.00	30.00	486.78	267.17	12.65	3.16
BH-40	1.00	34.00	31.50	31.50	508.20	283.81	12.65	3.16
BH-40	1.00	35.00	32.50	32.50	522.48	294.91	12.65	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	19.00	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	14.25	28.50	4.71	2.71	24.00	26.71	10.68	5.16
2	4.00	5.50	1.50	Granular	19.00	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	42.75	57.00	4.71	8.12	43.51	54.33	21.73	9.08
3	5.50	7.00	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	71.25	85.50	4.71	15.29	97.82	123.93	49.57	15.01
4	7.00	8.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	99.75	114.00	4.71	21.41	127.45	174.97	69.99	22.65
5	8.50	10.00	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	128.25	142.50	4.71	27.52	157.09	232.13	92.85	32.01
6	10.00	11.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	156.75	171.00	4.71	33.64	186.72	295.41	118.16	43.08
7	11.50	13.00	1.50	Granular	20.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	186.00	201.00	4.71	42.99	294.64	446.31	178.52	56.76
8	13.00	14.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	208.65	216.29	4.71	48.22	310.04	509.94	203.98	71.91
9	14.50	16.00	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	216.29	216.29	4.71	49.99	310.04	559.93	223.97	87.56
10	16.00	17.50	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	216.29	216.29	4.71	49.99	310.04	609.92	243.97	103.21
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	216.29	216.29	4.71	51.77	350.22	701.87	280.75	119.35
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	216.29	216.29	4.71	51.77	350.22	753.64	301.46	135.50
13	20.50	22.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	216.29	216.29	4.71	51.77	350.22	805.42	322.17	151.64
14	22.00	23.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	216.29	216.29	4.71	51.77	350.22	857.19	342.88	167.79
15	23.50	25.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	216.29	216.29	4.71	51.77	350.22	908.97	363.59	183.94
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	216.29	216.29	4.71	53.56	390.40	1002.71	401.08	200.58
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	216.29	216.29	4.71	53.56	390.40	1056.27	422.51	217.23
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	216.29	216.29	4.71	53.56	390.40	1109.82	443.93	233.88
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	216.29	216.29	4.71	53.56	390.40	1163.38	465.35	250.52
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	216.29	216.29	4.71	53.56	390.40	1216.94	486.78	267.17
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	216.29	216.29	4.71	53.56	390.40	1270.50	508.20	283.81
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	216.29	216.29	3.14	35.71	390.40	1306.21	522.48	294.91

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	32.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	34.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	35.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-40	-
Chainage	4+518	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	246.87	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	13.70	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-40	1.20	20.50	18.00	18.00	434.55	175.30	15.51	3.88
BH-40	1.20	22.00	19.50	19.50	462.92	197.53	15.86	3.96
BH-40	1.20	23.50	21.00	21.00	491.28	219.76	16.20	4.05
BH-40	1.20	25.00	22.50	22.50	519.65	241.99	16.20	4.05
BH-40	1.20	26.50	24.00	24.00	575.43	264.91	16.54	4.14
BH-40	1.20	28.00	25.50	25.50	604.77	287.83	16.54	4.14
BH-40	1.20	29.50	27.00	27.00	634.12	310.74	16.54	4.14
BH-40	1.20	31.00	28.50	28.50	663.46	333.66	16.54	4.14
BH-40	1.20	32.50	30.00	30.00	692.80	356.57	16.54	4.14
BH-40	1.20	34.00	31.50	31.50	722.15	379.49	16.54	4.14
BH-40	1.20	35.00	32.50	32.50	741.71	394.76	16.54	4.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	19.00	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	14.25	28.50	5.65	3.25	35.86	39.10	15.64	7.24
2	4.00	5.50	1.50	Granular	19.00	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	42.75	57.00	5.65	9.74	63.95	76.93	30.77	12.34
3	5.50	7.00	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	71.25	85.50	5.65	18.35	143.42	174.76	69.90	19.86
4	7.00	8.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	99.75	114.00	5.65	25.69	186.10	243.12	97.25	29.43
5	8.50	10.00	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	128.25	142.50	5.65	33.03	228.77	318.82	127.53	41.05
6	10.00	11.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	156.75	171.00	5.65	40.37	271.45	401.87	160.75	54.73
7	11.50	13.00	1.50	Granular	20.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	186.00	201.00	5.65	51.59	427.85	609.85	243.94	71.55
8	13.00	14.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	208.65	216.29	5.65	57.87	448.28	688.15	275.26	90.12
9	14.50	16.00	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	223.94	231.58	5.65	62.11	479.20	781.18	312.47	109.89
10	16.00	17.50	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	239.23	246.87	5.65	66.35	510.12	878.45	351.38	130.84
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	246.87	246.87	5.65	70.91	576.22	1015.46	406.19	153.07
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	246.87	246.87	5.65	70.91	576.22	1086.38	434.55	175.30
13	20.50	22.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	246.87	246.87	5.65	70.91	576.22	1157.29	462.92	197.53
14	22.00	23.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	246.87	246.87	5.65	70.91	576.22	1228.20	491.28	219.76
15	23.50	25.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	246.87	246.87	5.65	70.91	576.22	1299.12	519.65	241.99
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	246.87	246.87	5.65	73.36	642.32	1438.58	575.43	264.91
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	246.87	246.87	5.65	73.36	642.32	1511.94	604.77	287.83
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	246.87	246.87	5.65	73.36	642.32	1585.29	634.12	310.74
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	246.87	246.87	5.65	73.36	642.32	1658.65	663.46	333.66
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	246.87	246.87	5.65	73.36	642.32	1732.01	692.80	356.57
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	246.87	246.87	5.65	73.36	642.32	1805.37	722.15	379.49
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	246.87	246.87	3.77	48.91	642.32	1854.27	741.71	394.76

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	32.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	34.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	35.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-31	-
Chainage	3+643	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-31	1.00	22.00	19.50	19.50	152.64	80.26	8.28	2.07
BH-31	1.00	23.50	21.00	21.00	162.38	88.73	8.28	2.07
BH-31	1.00	25.00	22.50	22.50	172.12	97.19	8.28	2.07
BH-31	1.00	26.50	24.00	24.00	181.86	105.66	8.28	2.07
BH-31	1.00	28.00	25.50	25.50	191.75	114.13	8.28	2.07
BH-31	1.00	29.50	27.00	27.00	201.49	122.59	8.61	2.15
BH-31	1.00	30.00	27.50	27.50	204.74	125.42	8.61	2.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	6.15	12.29	4.71	1.22	12.06	13.28	5.31	4.74
2	4.00	5.50	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	18.44	24.58	4.71	3.65	21.54	26.40	10.56	7.41
3	5.50	7.00	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	30.73	36.87	4.71	6.34	34.85	46.06	18.42	10.84
4	7.00	8.50	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	43.02	49.16	4.71	8.88	45.39	65.47	26.19	14.97
5	8.50	10.00	1.50	Granular	8.19	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	55.31	61.45	4.71	11.87	67.74	99.70	39.88	19.94
6	10.00	11.50	1.50	Granular	8.19	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	67.60	73.74	4.71	14.51	80.52	126.98	50.79	25.65
7	11.50	13.00	1.50	Granular	8.19	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	79.89	86.03	4.71	17.14	93.30	156.91	62.76	32.10
8	13.00	14.50	1.50	Granular	8.19	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	92.18	98.32	4.71	19.78	106.08	189.47	75.79	39.29
9	14.50	16.00	1.50	Granular	9.69	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	98.32	98.32	4.71	22.72	144.07	250.18	100.07	47.30
10	16.00	17.50	1.50	Granular	9.69	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	98.32	98.32	4.71	22.72	144.07	272.90	109.16	55.32
11	17.50	19.00	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	18.25	19.00	98.32	98.32	4.71	23.54	162.71	315.08	126.03	63.56
12	19.00	20.50	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	19.75	20.50	98.32	98.32	4.71	23.54	162.71	338.62	135.45	71.79
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	98.32	98.32	4.71	24.35	181.36	381.61	152.64	80.26
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	98.32	98.32	4.71	24.35	181.36	405.96	162.38	88.73
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	98.32	98.32	4.71	24.35	181.36	430.30	172.12	97.19
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	98.32	98.32	4.71	24.35	181.36	454.65	181.86	105.66
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	98.32	98.32	4.71	24.35	181.74	479.38	191.75	114.13
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	98.32	98.32	4.71	24.35	181.74	503.73	201.49	122.59
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	98.32	98.32	1.57	8.12	181.74	511.84	204.74	125.42

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
2	22.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
3	24.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
4	25.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
5	27.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
6	28.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	30.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-31	-
Chainage	3+643	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	127.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-31	1.20	22.00	19.50	19.50	244.43	111.47	10.85	2.71
BH-31	1.20	23.50	21.00	21.00	259.58	124.45	10.85	2.71
BH-31	1.20	25.00	22.50	22.50	274.72	137.42	10.85	2.71
BH-31	1.20	26.50	24.00	24.00	289.86	150.40	10.85	2.71
BH-31	1.20	28.00	25.50	25.50	305.27	163.38	10.85	2.71
BH-31	1.20	29.50	27.00	27.00	320.41	176.35	11.28	2.82
BH-31	1.20	30.00	27.50	27.50	325.46	180.68	11.28	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	6.15	12.29	5.65	1.46	18.11	19.57	7.83	6.74
2	4.00	5.50	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	18.44	24.58	5.65	4.38	31.76	37.60	15.04	10.34
3	5.50	7.00	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	30.73	36.87	5.65	7.61	51.11	64.56	25.83	14.85
4	7.00	8.50	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	43.02	49.16	5.65	10.65	66.29	90.39	36.16	20.21
5	8.50	10.00	1.50	Granular	8.19	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	55.31	61.45	5.65	14.24	98.65	137.00	54.80	26.57
6	10.00	11.50	1.50	Granular	8.19	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	67.60	73.74	5.65	17.41	117.05	172.81	69.12	33.82
7	11.50	13.00	1.50	Granular	8.19	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	79.89	86.03	5.65	20.57	135.46	211.78	84.71	41.96
8	13.00	14.50	1.50	Granular	8.19	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	92.18	98.32	5.65	23.74	153.86	253.93	101.57	50.98
9	14.50	16.00	1.50	Granular	9.69	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	105.59	112.86	5.65	29.28	238.59	367.94	147.18	61.55
10	16.00	17.50	1.50	Granular	9.69	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	120.13	127.40	5.65	33.32	267.99	430.66	172.26	73.26
11	17.50	19.00	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	18.25	19.00	127.40	127.40	5.65	36.60	302.68	501.94	200.78	85.88
12	19.00	20.50	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	19.75	20.50	127.40	127.40	5.65	36.60	302.68	538.54	215.42	98.50
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	127.40	127.40	5.65	37.86	337.37	611.08	244.43	111.47
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	127.40	127.40	5.65	37.86	337.37	648.94	259.58	124.45
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	127.40	127.40	5.65	37.86	337.37	686.80	274.72	137.42
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	127.40	127.40	5.65	37.86	337.37	724.66	289.86	150.40
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	127.40	127.40	5.65	37.86	338.03	763.18	305.27	163.38
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	127.40	127.40	5.65	37.86	338.03	801.03	320.41	176.35
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	127.40	127.40	1.88	12.62	338.03	813.65	325.46	180.68

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_e/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
2	22.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
3	24.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
4	25.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
5	27.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
6	28.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	30.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-32	-
Chainage	3+730	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.82	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-32	1.00	22.00	19.50	18.00	159.88	82.99	9.71	2.43
BH-32	1.00	23.50	21.00	19.50	170.06	91.77	10.06	2.51
BH-32	1.00	25.00	22.50	21.00	180.25	100.55	10.06	2.51
BH-32	1.00	26.50	24.00	22.50	190.43	109.33	10.06	2.51
BH-32	1.00	28.00	25.50	24.00	200.62	118.10	10.06	2.51
BH-32	1.00	29.50	27.00	25.50	210.80	126.88	10.40	2.60
BH-32	1.00	30.00	27.50	26.00	214.20	129.81	10.40	2.60

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	6.15	12.29	4.71	1.12	0.00	1.12	0.45	4.71
2	4.00	5.50	1.50	Granular	8.19	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	18.44	24.58	4.71	3.35	15.99	20.45	8.18	7.30
3	5.50	7.00	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	30.73	36.87	4.71	6.34	34.85	45.65	18.26	10.72
4	7.00	8.50	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	43.02	49.16	4.71	8.88	45.39	65.07	26.03	14.86
5	8.50	10.00	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	55.31	61.45	4.71	11.41	55.93	87.02	34.81	19.70
6	10.00	11.50	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	67.60	73.74	4.71	13.95	66.47	111.51	44.60	25.26
7	11.50	13.00	1.50	Granular	9.69	0.07	27	-	13.80	15.50	1.00	-	12.25	13.00	81.01	88.28	4.71	18.05	113.16	176.25	70.50	31.96
8	13.00	14.50	1.50	Granular	9.69	0.07	27	-	13.80	15.50	1.00	-	13.75	14.50	95.55	102.82	4.71	21.29	130.92	215.32	86.13	39.57
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	102.82	102.82	4.71	24.61	169.85	278.86	111.54	48.11
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	102.82	102.82	4.71	24.61	169.85	303.47	121.39	56.65
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	102.82	102.82	4.71	25.46	189.32	348.39	139.36	65.43
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	102.82	102.82	4.71	25.46	189.32	373.85	149.54	74.21
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	102.82	102.82	4.71	25.46	189.70	399.70	159.88	82.99
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	102.82	102.82	4.71	25.46	189.70	425.16	170.06	91.77
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	102.82	102.82	4.71	25.46	189.70	450.62	180.25	100.55
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	102.82	102.82	4.71	25.46	189.70	476.08	190.43	109.33
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	102.82	102.82	4.71	25.46	189.70	501.54	200.62	118.10
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	102.82	102.82	4.71	25.46	189.70	527.01	210.80	126.88
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	102.82	102.82	1.57	8.49	189.70	535.49	214.20	129.81

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.50	0.206	0.824	9.71	2.43	34.55	15.79	23.30	5.83	82.92	37.90
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
5	27.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
6	28.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
7	30.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-32	-
Chainage	3+730	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	131.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-32	1.20	22.00	19.50	18.00	254.31	114.99	12.64	3.16
BH-32	1.20	23.50	21.00	19.50	269.99	128.34	13.09	3.27
BH-32	1.20	25.00	22.50	21.00	285.66	141.69	13.09	3.27
BH-32	1.20	26.50	24.00	22.50	301.34	155.04	13.09	3.27
BH-32	1.20	28.00	25.50	24.00	317.02	168.39	13.09	3.27
BH-32	1.20	29.50	27.00	25.50	332.70	181.74	13.53	3.38
BH-32	1.20	30.00	27.50	26.00	337.92	186.19	13.53	3.38

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	6.15	12.29	5.65	1.34	0.00	1.34	0.54	6.71
2	4.00	5.50	1.50	Granular	8.19	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	18.44	24.58	5.65	4.02	23.40	28.75	11.50	10.21
3	5.50	7.00	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	30.73	36.87	5.65	7.61	51.11	64.08	25.63	14.71
4	7.00	8.50	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	43.02	49.16	5.65	10.65	66.29	89.91	35.96	20.07
5	8.50	10.00	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	55.31	61.45	5.65	13.70	81.47	118.78	47.51	26.28
6	10.00	11.50	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	67.60	73.74	5.65	16.74	96.64	150.69	60.28	33.34
7	11.50	13.00	1.50	Granular	9.69	0.07	27	-	13.80	15.50	1.00	-	12.25	13.00	81.01	88.28	5.65	21.67	164.46	240.18	96.07	41.78
8	13.00	14.50	1.50	Granular	9.69	0.07	27	-	13.80	15.50	1.00	-	13.75	14.50	95.55	102.82	5.65	25.55	190.05	291.32	116.53	51.31
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	110.09	117.36	5.65	31.62	279.74	412.63	165.05	62.54
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	124.63	131.90	5.65	35.80	312.96	481.65	192.66	74.94
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	131.90	131.90	5.65	39.19	348.83	556.72	222.69	88.29
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	131.90	131.90	5.65	39.19	348.83	595.91	238.36	101.64
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	131.90	131.90	5.65	39.19	349.49	635.77	254.31	114.99
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	131.90	131.90	5.65	39.19	349.49	674.96	269.99	128.34
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	131.90	131.90	5.65	39.19	349.49	714.16	285.66	141.69
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	131.90	131.90	5.65	39.19	349.49	753.35	301.34	155.04
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	131.90	131.90	5.65	39.19	349.49	792.55	317.02	168.39
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	131.90	131.90	5.65	39.19	349.49	831.74	332.70	181.74
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	131.90	131.90	1.88	13.06	349.49	844.81	337.92	186.19

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.64	3.16	52.53	23.86	30.34	7.58	126.06	57.27
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
5	27.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
6	28.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
7	30.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-33	-
Chainage	3+792	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.82	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-33	1.00	22.00	19.50	18.00	159.12	82.46	9.36	2.34
BH-33	1.00	23.50	21.00	19.50	169.30	91.24	9.71	2.43
BH-33	1.00	25.00	22.50	21.00	179.49	100.01	9.71	2.43
BH-33	1.00	26.50	24.00	22.50	189.67	108.79	10.06	2.51
BH-33	1.00	28.00	25.50	24.00	199.86	117.57	10.40	2.60
BH-33	1.00	29.50	27.00	25.50	210.04	126.35	10.73	2.68
BH-33	1.00	30.00	27.50	26.00	213.44	129.28	10.73	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	6.15	12.29	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	18.44	24.58	4.71	3.65	21.54	25.19	10.08	7.07
3	5.50	7.00	1.50	Granular	8.19	0.00	26	-	11.90	13.19	1.00	-	6.25	7.00	30.73	36.87	4.71	6.59	42.18	52.43	20.97	10.57
4	7.00	8.50	1.50	Granular	8.19	0.00	26	-	11.90	13.19	1.00	-	7.75	8.50	43.02	49.16	4.71	9.23	54.96	74.44	29.78	14.80
5	8.50	10.00	1.50	Granular	8.19	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	55.31	61.45	4.71	11.41	55.93	86.82	34.73	19.64
6	10.00	11.50	1.50	Granular	8.19	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	67.60	73.74	4.71	13.95	66.47	111.31	44.52	25.20
7	11.50	13.00	1.50	Granular	9.69	0.03	27	-	13.80	15.50	1.00	-	12.25	13.00	81.01	88.28	4.71	18.05	113.16	176.05	70.42	31.90
8	13.00	14.50	1.50	Granular	9.69	0.03	27	-	13.80	15.50	1.00	-	13.75	14.50	95.55	102.82	4.71	21.29	130.92	215.11	86.05	39.52
9	14.50	16.00	1.50	Granular	9.69	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	102.82	102.82	4.71	23.76	150.39	258.34	103.34	47.82
10	16.00	17.50	1.50	Granular	9.69	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	102.82	102.82	4.71	23.76	150.39	282.10	112.84	56.12
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	102.82	102.82	4.71	25.46	189.70	346.88	138.75	64.90
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	102.82	102.82	4.71	25.46	189.70	372.34	148.94	73.68
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	102.82	102.82	4.71	25.46	189.70	397.80	159.12	82.46
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	102.82	102.82	4.71	25.46	189.70	423.26	169.30	91.24
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	102.82	102.82	4.71	25.46	189.70	448.72	179.49	100.01
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	102.82	102.82	4.71	25.46	189.70	474.18	189.67	108.79
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	102.82	102.82	4.71	25.46	189.70	499.64	199.86	117.57
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	102.82	102.82	4.71	25.46	189.70	525.11	210.04	126.35
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	102.82	102.82	1.57	8.49	189.70	533.59	213.44	129.28

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.11	2.00	1.83	7.20	6.58	0.214	0.855	9.36	2.34	33.70	15.40	22.46	5.61	80.89	36.95
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.50	0.206	0.824	9.71	2.43	34.55	15.79	23.30	5.83	82.92	37.90
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.50	0.206	0.824	9.71	2.43	34.55	15.79	23.30	5.83	82.92	37.90
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
7	30.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-33	-
Chainage	3+792	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	131.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-33	1.20	22.00	19.50	18.00	253.28	114.27	12.18	3.05
BH-33	1.20	23.50	21.00	19.50	268.96	127.62	12.64	3.16
BH-33	1.20	25.00	22.50	21.00	284.64	140.97	12.64	3.16
BH-33	1.20	26.50	24.00	22.50	300.31	154.32	13.09	3.27
BH-33	1.20	28.00	25.50	24.00	315.99	167.67	13.53	3.38
BH-33	1.20	29.50	27.00	25.50	331.67	181.02	13.97	3.49
BH-33	1.20	30.00	27.50	26.00	336.90	185.47	13.97	3.49

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	6.15	12.29	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	18.44	24.58	5.65	4.38	31.76	36.14	14.46	9.94
3	5.50	7.00	1.50	Granular	8.19	0.00	26	-	11.90	13.19	1.00	-	6.25	7.00	30.73	36.87	5.65	7.91	61.85	74.14	29.66	14.53
4	7.00	8.50	1.50	Granular	8.19	0.00	26	-	11.90	13.19	1.00	-	7.75	8.50	43.02	49.16	5.65	11.08	80.25	103.62	41.45	20.00
5	8.50	10.00	1.50	Granular	8.19	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	55.31	61.45	5.65	13.70	81.47	118.53	47.41	26.21
6	10.00	11.50	1.50	Granular	8.19	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	67.60	73.74	5.65	16.74	96.64	150.45	60.18	33.27
7	11.50	13.00	1.50	Granular	9.69	0.03	27	-	13.80	15.50	1.00	-	12.25	13.00	81.01	88.28	5.65	21.67	164.46	239.93	95.97	41.72
8	13.00	14.50	1.50	Granular	9.69	0.03	27	-	13.80	15.50	1.00	-	13.75	14.50	95.55	102.82	5.65	25.55	190.05	291.08	116.43	51.25
9	14.50	16.00	1.50	Granular	9.69	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	110.09	117.36	5.65	30.53	247.69	379.25	151.70	62.17
10	16.00	17.50	1.50	Granular	9.69	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	124.63	131.90	5.65	34.57	277.09	443.22	177.29	74.22
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	131.90	131.90	5.65	39.19	349.49	554.81	221.92	87.57
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	131.90	131.90	5.65	39.19	349.49	594.01	237.60	100.92
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	131.90	131.90	5.65	39.19	349.49	633.20	253.28	114.27
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	131.90	131.90	5.65	39.19	349.49	672.39	268.96	127.62
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	131.90	131.90	5.65	39.19	349.49	711.59	284.64	140.97
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	131.90	131.90	5.65	39.19	349.49	750.78	300.31	154.32
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	131.90	131.90	5.65	39.19	349.49	789.98	315.99	167.67
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	131.90	131.90	5.65	39.19	349.49	829.17	331.67	181.02
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	131.90	131.90	1.88	13.06	349.49	842.24	336.90	185.47

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.96	2.02	1.84	8.41	7.64	0.164	0.657	12.18	3.05	51.25	23.27	29.24	7.31	122.99	55.85
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.64	3.16	52.53	23.86	30.34	7.58	126.06	57.27
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.64	3.16	52.53	23.86	30.34	7.58	126.06	57.27
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
7	30.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-34	-
Chainage	3+883	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	108.07	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-34	1.00	22.00	19.50	16.50	166.03	84.70	11.80	2.95
BH-34	1.00	23.50	21.00	18.00	176.74	93.84	12.15	3.04
BH-34	1.00	25.00	22.50	19.50	187.44	102.98	12.15	3.04
BH-34	1.00	26.50	24.00	21.00	198.15	112.13	12.15	3.04
BH-34	1.00	28.00	25.50	22.50	208.85	121.27	12.49	3.12
BH-34	1.00	29.50	27.00	24.00	219.56	130.41	12.49	3.12
BH-34	1.00	30.00	27.50	24.50	223.12	133.46	12.82	3.21

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.19	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	16.19	22.33	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	8.19	0.04	24	-	8.00	9.78	1.00	-	6.25	7.00	28.48	34.62	4.71	5.64	29.28	34.92	13.97	9.28
4	7.00	8.50	1.50	Granular	8.19	0.04	24	-	8.00	9.78	1.00	-	7.75	8.50	40.77	46.91	4.71	8.08	38.75	52.47	20.99	13.19
5	8.50	10.00	1.50	Granular	10.19	0.00	27	-	13.80	15.50	1.00	-	9.25	10.00	54.56	62.20	4.71	12.16	81.56	107.43	42.97	18.24
6	10.00	11.50	1.50	Granular	10.19	0.00	27	-	13.80	15.50	1.00	-	10.75	11.50	69.85	77.49	4.71	15.57	100.24	141.68	56.67	24.25
7	11.50	13.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	85.14	92.78	4.71	20.38	154.27	216.09	86.44	31.60
8	13.00	14.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	100.43	108.07	4.71	24.04	178.53	264.39	105.76	39.98
9	14.50	16.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	108.07	108.07	4.71	25.87	178.18	289.91	115.96	48.88
10	16.00	17.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	108.07	108.07	4.71	25.87	178.18	315.78	126.31	57.77
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	108.07	108.07	4.71	25.87	178.53	342.00	136.80	66.66
12	19.00	20.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	108.07	108.07	4.71	25.87	178.53	367.86	147.15	75.56
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	108.07	108.07	4.71	26.76	198.99	415.08	166.03	84.70
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	108.07	108.07	4.71	26.76	198.99	441.84	176.74	93.84
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	108.07	108.07	4.71	26.76	198.99	468.61	187.44	102.98
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	108.07	108.07	4.71	26.76	198.99	495.37	198.15	112.13
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	108.07	108.07	4.71	26.76	198.99	522.13	208.85	121.27
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	108.07	108.07	4.71	26.76	198.99	548.89	219.56	130.41
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	108.07	108.07	1.57	8.92	198.99	557.81	223.12	133.46

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
7	30.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-34	-
Chainage	3+883	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	108.07	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-34	1.20	22.00	19.50	16.50	219.25	107.44	15.33	3.83
BH-34	1.20	23.50	21.00	18.00	232.09	118.81	15.78	3.95
BH-34	1.20	25.00	22.50	19.50	244.94	130.18	15.78	3.95
BH-34	1.20	26.50	24.00	21.00	257.78	141.54	15.78	3.95
BH-34	1.20	28.00	25.50	22.50	270.63	152.91	16.23	4.06
BH-34	1.20	29.50	27.00	24.00	283.47	164.28	16.23	4.06
BH-34	1.20	30.00	27.50	24.50	287.75	168.07	16.66	4.17

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.19	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	16.19	22.33	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	8.19	0.04	24	-	8.00	9.78	1.00	-	6.25	7.00	28.48	34.62	5.65	6.77	42.90	49.67	19.87	12.98
4	7.00	8.50	1.50	Granular	8.19	0.04	24	-	8.00	9.78	1.00	-	7.75	8.50	40.77	46.91	5.65	9.69	56.55	73.01	29.20	18.07
5	8.50	10.00	1.50	Granular	10.19	0.00	27	-	13.80	15.50	1.00	-	9.25	10.00	54.56	62.20	5.65	14.59	119.04	150.09	60.04	24.53
6	10.00	11.50	1.50	Granular	10.19	0.00	27	-	13.80	15.50	1.00	-	10.75	11.50	69.85	77.49	5.65	18.68	145.95	195.67	78.27	32.13
7	11.50	13.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	12.25	13.00	85.14	92.78	5.65	24.45	224.19	298.37	119.35	41.36
8	13.00	14.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	100.43	108.07	5.65	28.85	259.12	362.15	144.86	51.81
9	14.50	16.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	108.07	108.07	5.65	31.04	258.52	392.59	157.04	62.87
10	16.00	17.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	108.07	108.07	5.65	31.04	258.52	423.64	169.45	73.94
11	17.50	19.00	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	108.07	108.07	5.65	31.04	259.12	455.28	182.11	85.01
12	19.00	20.50	1.50	Granular	10.19	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	108.07	108.07	5.65	31.04	259.12	486.32	194.53	96.08
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	108.07	108.07	5.65	32.11	288.80	548.11	219.25	107.44
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	108.07	108.07	5.65	32.11	288.80	580.23	232.09	118.81
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	108.07	108.07	5.65	32.11	288.80	612.34	244.94	130.18
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	108.07	108.07	5.65	32.11	288.80	644.45	257.78	141.54
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	108.07	108.07	5.65	32.11	288.80	676.57	270.63	152.91
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	108.07	108.07	5.65	32.11	288.80	708.68	283.47	164.28
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	108.07	108.07	1.88	10.70	288.80	719.39	287.75	168.07

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
7	30.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-35	-
Chainage	4+014	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.62	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-35	1.00	22.00	19.50	16.50	172.51	87.96	13.16	3.29
BH-35	1.00	23.50	21.00	18.00	183.46	97.28	13.48	3.37
BH-35	1.00	25.00	22.50	19.50	194.42	106.60	13.80	3.45
BH-35	1.00	26.50	24.00	21.00	205.38	115.92	13.80	3.45
BH-35	1.00	28.00	25.50	22.50	216.33	125.24	14.12	3.53
BH-35	1.00	29.50	27.00	24.00	227.29	134.56	14.12	3.53
BH-35	1.00	30.00	27.50	24.50	230.94	137.67	14.12	3.53

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.29	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	16.41	21.88	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	9.69	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	29.15	36.42	4.71	6.26	42.42	48.67	19.47	9.45
4	7.00	8.50	1.50	Granular	9.69	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	43.69	50.96	4.71	9.38	57.54	73.17	29.27	13.72
5	8.50	10.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	58.23	65.50	4.71	13.94	110.64	140.21	56.09	19.28
6	10.00	11.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	72.77	80.04	4.71	17.42	133.71	180.70	72.28	25.80
7	11.50	13.00	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	87.69	95.33	4.71	20.99	158.32	226.30	90.52	33.33
8	13.00	14.50	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	102.98	110.62	4.71	24.65	182.57	275.20	110.08	41.88
9	14.50	16.00	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	110.62	110.62	4.71	26.48	182.57	301.68	120.67	50.94
10	16.00	17.50	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	110.62	110.62	4.71	26.48	182.57	328.16	131.27	60.01
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	110.62	110.62	4.71	27.39	203.50	376.48	150.59	69.33
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	110.62	110.62	4.71	27.39	203.50	403.87	161.55	78.65
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	110.62	110.62	4.71	27.39	203.50	431.26	172.51	87.96
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	110.62	110.62	4.71	27.39	203.50	458.66	183.46	97.28
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	110.62	110.62	4.71	27.39	203.50	486.05	194.42	106.60
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	110.62	110.62	4.71	27.39	203.50	513.44	205.38	115.92
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	110.62	110.62	4.71	27.39	203.50	540.83	216.33	125.24
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	110.62	110.62	4.71	27.39	203.50	568.23	227.29	134.56
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	110.62	110.62	1.57	9.13	203.50	577.36	230.94	137.67

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21
2	22.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.68	1.95	1.81	6.38	5.94	0.148	0.593	13.48	3.37	42.99	20.00	32.35	8.09	103.19	48.01
3	24.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
4	25.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
5	27.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
6	28.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
7	30.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-35	-
Chainage	4+014	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	141.20	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-35	1.20	22.00	19.50	16.50	273.02	121.46	17.09	4.27
BH-35	1.20	23.50	21.00	18.00	289.80	135.58	17.51	4.38
BH-35	1.20	25.00	22.50	19.50	306.58	149.70	17.93	4.48
BH-35	1.20	26.50	24.00	21.00	323.37	163.83	17.93	4.48
BH-35	1.20	28.00	25.50	22.50	340.15	177.95	18.34	4.59
BH-35	1.20	29.50	27.00	24.00	356.93	192.07	18.34	4.59
BH-35	1.20	30.00	27.50	24.50	362.53	196.78	18.34	4.59

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.29	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	16.41	21.88	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	9.69	0.04	26	-	11.90	13.19	1.00	-	6.25	7.00	29.15	36.42	5.65	7.51	62.39	69.90	27.96	13.19
4	7.00	8.50	1.50	Granular	9.69	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	43.69	50.96	5.65	11.25	84.16	102.92	41.17	18.71
5	8.50	10.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	9.25	10.00	58.23	65.50	5.65	16.73	161.26	196.75	78.70	25.77
6	10.00	11.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	10.75	11.50	72.77	80.04	5.65	20.90	194.48	250.87	100.35	34.00
7	11.50	13.00	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	87.69	95.33	5.65	25.19	230.01	311.59	124.63	43.42
8	13.00	14.50	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	102.98	110.62	5.65	29.58	264.94	376.10	150.44	54.08
9	14.50	16.00	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	118.27	125.91	5.65	33.97	299.87	445.00	178.00	65.97
10	16.00	17.50	1.50	Granular	10.19	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	133.56	141.20	5.65	38.36	334.81	518.30	207.32	79.09
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	141.20	141.20	5.65	41.96	373.18	598.63	239.45	93.21
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	141.20	141.20	5.65	41.96	373.18	640.59	256.23	107.33
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	141.20	141.20	5.65	41.96	373.18	682.54	273.02	121.46
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	141.20	141.20	5.65	41.96	373.18	724.50	289.80	135.58
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	141.20	141.20	5.65	41.96	373.18	766.46	306.58	149.70
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	141.20	141.20	5.65	41.96	373.18	808.42	323.37	163.83
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	141.20	141.20	5.65	41.96	373.18	850.38	340.15	177.95
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	141.20	141.20	5.65	41.96	373.18	892.34	356.93	192.07
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	141.20	141.20	1.88	13.99	373.18	906.32	362.53	196.78

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22
2	22.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.45	1.97	1.82	7.45	6.89	0.114	0.457	17.51	4.38	65.28	30.17	42.03	10.51	156.67	72.42
3	24.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
4	25.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
5	27.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
6	28.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
7	30.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-36	-
Chainage	4+093	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.47	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-36	1.00	20.50	18.00	18.00	154.21	79.43	10.16	2.54
BH-36	1.00	22.00	19.50	19.50	173.51	88.74	10.45	2.61
BH-36	1.00	23.50	21.00	21.00	184.45	98.05	10.45	2.61
BH-36	1.00	25.00	22.50	22.50	195.39	107.36	10.74	2.68
BH-36	1.00	26.50	24.00	24.00	206.33	116.67	11.02	2.76
BH-36	1.00	28.00	25.50	25.50	217.28	125.98	11.02	2.76
BH-36	1.00	29.50	27.00	27.00	228.22	135.28	11.30	2.83
BH-36	1.00	31.00	28.50	28.50	239.16	144.59	11.30	2.83
BH-36	1.00	32.50	30.00	30.00	250.10	153.90	11.30	2.83
BH-36	1.00	34.00	31.50	31.50	261.04	163.21	11.30	2.83
BH-36	1.00	35.00	32.50	32.50	268.34	169.42	11.30	2.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.19	0.04	24	-	8.00	9.78	1.00	-	3.25	4.00	6.90	13.79	4.71	1.37	13.53	14.90	5.96	4.78
2	4.00	5.50	1.50	Granular	9.19	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	20.69	27.58	4.71	4.10	24.16	29.63	11.85	7.58
3	5.50	7.00	1.50	Granular	9.19	0.00	27	-	13.80	15.50	1.00	-	6.25	7.00	34.48	41.37	4.71	7.68	55.56	68.70	27.48	11.38
4	7.00	8.50	1.50	Granular	8.89	0.00	27	-	13.80	15.50	1.00	-	7.75	8.50	48.04	54.71	4.71	10.71	71.70	95.55	38.22	16.03
5	8.50	10.00	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	61.38	68.05	4.71	13.17	74.93	111.96	44.78	21.36
6	10.00	11.50	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	74.72	81.39	4.71	16.04	88.80	141.86	56.75	27.50
7	11.50	13.00	1.50	Granular	9.69	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	88.66	95.93	4.71	20.49	140.71	214.27	85.71	34.89
8	13.00	14.50	1.50	Granular	9.69	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	103.20	110.47	4.71	23.85	161.13	258.54	103.41	43.22
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	110.47	110.47	4.71	26.44	181.99	305.84	122.34	52.27
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	110.47	110.47	4.71	26.44	181.99	332.28	132.91	61.32
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	110.47	110.47	4.71	26.44	182.34	359.07	143.63	70.38
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	110.47	110.47	4.71	26.44	182.34	385.52	154.21	79.43
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	110.47	110.47	4.71	27.36	203.23	433.77	173.51	88.74
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	110.47	110.47	4.71	27.36	203.23	461.12	184.45	98.05
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	110.47	110.47	4.71	27.36	203.23	488.48	195.39	107.36
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	110.47	110.47	4.71	27.36	203.23	515.83	206.33	116.67
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	110.47	110.47	4.71	27.36	203.23	543.19	217.28	125.98
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	110.47	110.47	4.71	27.36	203.23	570.54	228.22	135.28
19	29.50	31.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	30.25	31.00	110.47	110.47	4.71	27.36	203.23	597.90	239.16	144.59
20	31.00	32.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	31.75	32.50	110.47	110.47	4.71	27.36	203.23	625.26	250.10	153.90
21	32.50	34.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	33.25	34.00	110.47	110.47	4.71	27.36	203.23	652.61	261.04	163.21
22	34.00	35.00	1.00	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	34.50	35.00	110.47	110.47	3.14	18.24	203.23	670.85	268.34	169.42

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
2	22.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
3	23.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
4	25.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
5	26.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
6	28.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
7	29.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	31.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	32.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	34.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	35.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-36	-
Chainage	4+093	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	139.55	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-36	1.20	20.50	18.00	18.00	239.96	107.74	13.30	3.32
BH-36	1.20	22.00	19.50	19.50	271.73	121.73	13.68	3.42
BH-36	1.20	23.50	21.00	21.00	288.32	135.72	13.68	3.42
BH-36	1.20	25.00	22.50	22.50	304.90	149.70	14.06	3.51
BH-36	1.20	26.50	24.00	24.00	321.49	163.69	14.43	3.61
BH-36	1.20	28.00	25.50	25.50	338.08	177.67	14.43	3.61
BH-36	1.20	29.50	27.00	27.00	354.66	191.66	14.79	3.70
BH-36	1.20	31.00	28.50	28.50	371.25	205.65	14.79	3.70
BH-36	1.20	32.50	30.00	30.00	387.84	219.63	14.79	3.70
BH-36	1.20	34.00	31.50	31.50	404.43	233.62	14.79	3.70
BH-36	1.20	35.00	32.50	32.50	415.48	242.94	14.79	3.70

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.19	0.04	24	-	8.00	9.78	1.00	-	3.25	4.00	6.90	13.79	5.65	1.64	20.32	21.96	8.78	6.79
2	4.00	5.50	1.50	Granular	9.19	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	20.69	27.58	5.65	4.92	35.63	42.19	16.87	10.54
3	5.50	7.00	1.50	Granular	9.19	0.00	27	-	13.80	15.50	1.00	-	6.25	7.00	34.48	41.37	5.65	9.22	81.44	97.22	38.89	15.50
4	7.00	8.50	1.50	Granular	8.89	0.00	27	-	13.80	15.50	1.00	-	7.75	8.50	48.04	54.71	5.65	12.85	104.64	133.26	53.30	21.47
5	8.50	10.00	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	61.38	68.05	5.65	15.81	109.10	153.53	61.41	28.27
6	10.00	11.50	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	74.72	81.39	5.65	19.24	129.08	192.75	77.10	36.04
7	11.50	13.00	1.50	Granular	9.69	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	88.66	95.93	5.65	24.59	204.35	292.62	117.05	45.30
8	13.00	14.50	1.50	Granular	9.69	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	103.20	110.47	5.65	28.62	233.76	350.64	140.26	55.69
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	117.74	125.01	5.65	33.82	297.22	447.93	179.17	67.53
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	132.28	139.55	5.65	38.00	330.44	519.14	207.66	80.55
11	17.50	19.00	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	139.55	139.55	5.65	40.09	331.04	559.83	223.93	94.14
12	19.00	20.50	1.50	Granular	10.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	139.55	139.55	5.65	40.09	331.04	599.91	239.96	107.74
13	20.50	22.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	139.55	139.55	5.65	41.47	368.98	679.32	271.73	121.73
14	22.00	23.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	139.55	139.55	5.65	41.47	368.98	720.79	288.32	135.72
15	23.50	25.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	139.55	139.55	5.65	41.47	368.98	762.26	304.90	149.70
16	25.00	26.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	139.55	139.55	5.65	41.47	368.98	803.72	321.49	163.69
17	26.50	28.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	139.55	139.55	5.65	41.47	368.98	845.19	338.08	177.67
18	28.00	29.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	139.55	139.55	5.65	41.47	368.98	886.66	354.66	191.66
19	29.50	31.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	30.25	31.00	139.55	139.55	5.65	41.47	368.98	928.13	371.25	205.65
20	31.00	32.50	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	31.75	32.50	139.55	139.55	5.65	41.47	368.98	969.60	387.84	219.63
21	32.50	34.00	1.50	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	33.25	34.00	139.55	139.55	5.65	41.47	368.98	1011.06	404.43	233.62
22	34.00	35.00	1.00	Granular	10.19	0.01	30	-	19.50	22.44	1.00	-	34.50	35.00	139.55	139.55	3.77	27.65	368.98	1038.71	415.48	242.94

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
2	22.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
3	23.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
4	25.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
5	26.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
6	28.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
7	29.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	31.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	32.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	34.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	35.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-37	-
Chainage	4+210	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.52	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-37	1.00	20.50	18.00	18.00	115.44	72.23	8.93	2.23
BH-37	1.00	22.00	19.50	19.50	156.65	80.99	8.93	2.23
BH-37	1.00	23.50	21.00	21.00	166.81	89.74	8.93	2.23
BH-37	1.00	25.00	22.50	22.50	176.96	98.50	8.93	2.23
BH-37	1.00	26.50	24.00	24.00	187.11	107.26	8.93	2.23
BH-37	1.00	28.00	25.50	25.50	197.27	116.02	9.25	2.31
BH-37	1.00	29.50	27.00	27.00	207.58	124.77	9.25	2.31
BH-37	1.00	31.00	28.50	28.50	217.73	133.53	9.25	2.31
BH-37	1.00	32.50	30.00	30.00	227.89	142.29	9.25	2.31
BH-37	1.00	34.00	31.50	31.50	238.04	151.05	9.25	2.31
BH-37	1.00	35.00	32.50	32.50	244.81	156.89	9.25	2.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	6.15	12.29	4.71	1.17	10.35	11.52	4.61	4.72
2	4.00	5.50	1.50	Granular	8.19	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	18.44	24.58	4.71	3.50	18.76	23.43	9.37	7.35
3	5.50	7.00	1.50	Granular	8.19	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	30.73	36.87	4.71	6.85	49.51	61.03	24.41	10.92
4	7.00	8.50	1.50	Granular	8.89	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	43.54	50.21	4.71	9.70	66.20	87.41	34.97	15.29
5	8.50	10.00	1.50	Granular	8.89	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	56.88	63.55	4.71	11.74	58.00	90.96	36.38	20.22
6	10.00	11.50	1.50	Granular	8.89	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	70.22	76.89	4.71	14.49	69.45	116.89	46.76	25.93
7	11.50	13.00	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	12.25	13.00	83.56	90.23	4.71	17.93	97.99	163.37	65.35	32.60
8	13.00	14.50	1.50	Granular	8.19	0.07	26	-	11.90	13.19	1.00	-	13.75	14.50	96.38	102.52	4.71	20.68	110.45	196.51	78.60	40.04
9	14.50	16.00	1.50	Granular	8.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	102.52	102.52	4.71	23.69	149.04	258.80	103.52	48.32
10	16.00	17.50	1.50	Granular	8.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	102.52	102.52	4.71	23.69	149.04	282.49	113.00	56.61
11	17.50	19.00	1.50	Granular	8.19	0.00	26	-	11.90	13.19	1.00	-	18.25	19.00	102.52	102.52	4.71	22.00	110.45	265.90	106.36	64.42
12	19.00	20.50	1.50	Granular	9.69	0.00	26	-	11.90	13.19	1.00	-	19.75	20.50	102.52	102.52	4.71	22.00	111.15	288.60	115.44	72.23
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	102.52	102.52	4.71	25.39	188.79	391.63	156.65	80.99
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	102.52	102.52	4.71	25.39	188.79	417.01	166.81	89.74
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	102.52	102.52	4.71	25.39	188.79	442.40	176.96	98.50
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	102.52	102.52	4.71	25.39	188.79	467.79	187.11	107.26
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	102.52	102.52	4.71	25.39	188.79	493.17	197.27	116.02
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	102.52	102.52	4.71	25.39	189.17	518.95	207.58	124.77
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	102.52	102.52	4.71	25.39	189.17	544.33	217.73	133.53
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	102.52	102.52	4.71	25.39	189.17	569.72	227.89	142.29
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	102.52	102.52	4.71	25.39	189.17	595.11	238.04	151.05
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	102.52	102.52	3.14	16.92	189.17	612.03	244.81	156.89

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
2	22.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
3	23.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
4	25.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
5	26.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	0.70	2.06	1.85	7.32	6.57	0.224	0.896	8.93	2.23	32.68	14.67	21.44	5.36	78.43	35.20
6	28.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	29.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	31.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	32.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	34.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
7	35.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-37	-
Chainage	4+210	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	127.10	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-37	1.20	20.50	18.00	18.00	172.24	97.54	11.70	2.93
BH-37	1.20	22.00	19.50	19.50	242.72	110.49	11.70	2.93
BH-37	1.20	23.50	21.00	21.00	257.82	123.44	11.70	2.93
BH-37	1.20	25.00	22.50	22.50	272.93	136.39	11.70	2.93
BH-37	1.20	26.50	24.00	24.00	288.04	149.34	11.70	2.93
BH-37	1.20	28.00	25.50	25.50	303.15	162.29	12.11	3.03
BH-37	1.20	29.50	27.00	27.00	318.52	175.24	12.11	3.03
BH-37	1.20	31.00	28.50	28.50	333.63	188.19	12.11	3.03
BH-37	1.20	32.50	30.00	30.00	348.73	201.14	12.11	3.03
BH-37	1.20	34.00	31.50	31.50	363.84	214.09	12.11	3.03
BH-37	1.20	35.00	32.50	32.50	373.91	222.72	12.11	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	6.15	12.29	5.65	1.40	15.46	16.86	6.74	6.73
2	4.00	5.50	1.50	Granular	8.19	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	18.44	24.58	5.65	4.20	27.58	33.18	13.27	10.28
3	5.50	7.00	1.50	Granular	8.19	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	30.73	36.87	5.65	8.22	72.58	86.40	34.56	14.95
4	7.00	8.50	1.50	Granular	8.89	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	43.54	50.21	5.65	11.64	96.72	122.18	48.87	20.59
5	8.50	10.00	1.50	Granular	8.89	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	56.88	63.55	5.65	14.09	84.54	124.08	49.63	26.91
6	10.00	11.50	1.50	Granular	8.89	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	70.22	76.89	5.65	17.39	101.01	157.95	63.18	34.15
7	11.50	13.00	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	12.25	13.00	83.56	90.23	5.65	21.52	142.31	220.77	88.31	42.55
8	13.00	14.50	1.50	Granular	8.19	0.07	26	-	11.90	13.19	1.00	-	13.75	14.50	96.38	102.52	5.65	24.82	160.15	263.42	105.37	51.88
9	14.50	16.00	1.50	Granular	8.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	108.67	114.81	5.65	30.14	240.93	374.34	149.74	62.69
10	16.00	17.50	1.50	Granular	8.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	120.96	127.10	5.65	33.55	265.78	432.74	173.10	74.46
11	17.50	19.00	1.50	Granular	8.19	0.00	26	-	11.90	13.19	1.00	-	18.25	19.00	127.10	127.10	5.65	32.73	196.95	396.64	158.66	86.00
12	19.00	20.50	1.50	Granular	9.69	0.00	26	-	11.90	13.19	1.00	-	19.75	20.50	127.10	127.10	5.65	32.73	198.17	430.59	172.24	97.54
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	127.10	127.10	5.65	37.77	336.60	606.79	242.72	110.49
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	127.10	127.10	5.65	37.77	336.60	644.56	257.82	123.44
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	127.10	127.10	5.65	37.77	336.60	682.33	272.93	136.39
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	127.10	127.10	5.65	37.77	336.60	720.10	288.04	149.34
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	127.10	127.10	5.65	37.77	336.60	757.87	303.15	162.29
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	127.10	127.10	5.65	37.77	337.27	796.30	318.52	175.24
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	127.10	127.10	5.65	37.77	337.27	834.07	333.63	188.19
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	127.10	127.10	5.65	37.77	337.27	871.84	348.73	201.14
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	127.10	127.10	5.65	37.77	337.27	909.60	363.84	214.09
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	127.10	127.10	3.77	25.18	337.27	934.78	373.91	222.72

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
2	22.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
3	23.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
4	25.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
5	26.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.61	2.07	1.85	8.53	7.62	0.171	0.684	11.70	2.93	49.89	22.28	28.09	7.02	119.74	53.48
6	28.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	29.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	31.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	32.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	34.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
7	35.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-38	-
Chainage	4+334	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.02	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-38	1.00	20.50	18.00	18.00	141.62	73.68	8.28	2.07
BH-38	1.00	22.00	19.50	19.50	143.38	82.06	8.28	2.07
BH-38	1.00	23.50	21.00	21.00	152.99	90.44	8.28	2.07
BH-38	1.00	25.00	22.50	22.50	162.61	98.82	8.28	2.07
BH-38	1.00	26.50	24.00	24.00	172.23	107.20	8.28	2.07
BH-38	1.00	28.00	25.50	25.50	198.25	116.06	8.28	2.07
BH-38	1.00	29.50	27.00	27.00	208.55	124.93	8.61	2.15
BH-38	1.00	31.00	28.50	28.50	218.85	133.79	8.61	2.15
BH-38	1.00	32.50	30.00	30.00	229.46	142.65	8.61	2.15
BH-38	1.00	34.00	31.50	31.50	239.77	151.51	8.61	2.15
BH-38	1.00	35.00	32.50	32.50	246.64	157.42	8.61	2.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	6.15	12.29	4.71	1.22	12.06	13.28	5.31	4.74
2	4.00	5.50	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	18.44	24.58	4.71	3.65	21.54	26.40	10.56	7.41
3	5.50	7.00	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	30.73	36.87	4.71	6.34	34.85	46.06	18.42	10.84
4	7.00	8.50	1.50	Granular	8.89	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	43.54	50.21	4.71	8.98	46.56	66.76	26.70	15.00
5	8.50	10.00	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	56.88	63.55	4.71	12.21	70.25	102.65	41.06	20.07
6	10.00	11.50	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	70.22	76.89	4.71	15.07	84.12	131.60	52.64	25.94
7	11.50	13.00	1.50	Granular	8.89	0.07	25	-	10.00	10.88	1.00	-	12.25	13.00	83.56	90.23	4.71	17.24	80.89	145.60	58.24	32.41
8	13.00	14.50	1.50	Granular	9.19	0.07	25	-	10.00	10.88	1.00	-	13.75	14.50	97.13	104.02	4.71	20.04	92.83	177.59	71.03	39.68
9	14.50	16.00	1.50	Granular	9.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	104.02	104.02	4.71	24.04	151.76	260.56	104.23	48.06
10	16.00	17.50	1.50	Granular	9.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	104.02	104.02	4.71	24.04	151.76	284.60	113.84	56.44
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	104.02	104.02	4.71	24.90	171.41	329.15	131.66	65.06
12	19.00	20.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	104.02	104.02	4.71	24.90	171.41	354.05	141.62	73.68
13	20.50	22.00	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	21.25	22.00	104.02	104.02	4.71	24.04	151.76	358.44	143.38	82.06
14	22.00	23.50	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	22.75	23.50	104.02	104.02	4.71	24.04	151.76	382.49	152.99	90.44
15	23.50	25.00	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	24.25	25.00	104.02	104.02	4.71	24.04	151.76	406.53	162.61	98.82
16	25.00	26.50	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	25.75	26.50	104.02	104.02	4.71	24.04	151.76	430.57	172.23	107.20
17	26.50	28.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	104.02	104.02	4.71	25.76	191.05	495.62	198.25	116.06
18	28.00	29.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	104.02	104.02	4.71	25.76	191.05	521.37	208.55	124.93
19	29.50	31.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	104.02	104.02	4.71	25.76	191.05	547.13	218.85	133.79
20	31.00	32.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	104.02	104.02	4.71	25.76	191.82	573.66	229.46	142.65
21	32.50	34.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	104.02	104.02	4.71	25.76	191.82	599.42	239.77	151.51
22	34.00	35.00	1.00	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	104.02	104.02	3.14	17.17	191.82	616.59	246.64	157.42

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
2	22.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
3	23.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
4	25.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
5	26.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
6	28.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
7	29.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	31.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	32.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	34.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33
7	35.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-38	-
Chainage	4+334	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	131.60	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-38	1.20	20.50	18.00	18.00	221.73	100.40	10.85	2.71
BH-38	1.20	22.00	19.50	19.50	222.04	113.00	10.85	2.71
BH-38	1.20	23.50	21.00	21.00	236.64	125.59	10.85	2.71
BH-38	1.20	25.00	22.50	22.50	251.24	138.19	10.85	2.71
BH-38	1.20	26.50	24.00	24.00	265.84	150.78	10.85	2.71
BH-38	1.20	28.00	25.50	25.50	310.06	164.11	10.85	2.71
BH-38	1.20	29.50	27.00	27.00	325.71	177.43	11.28	2.82
BH-38	1.20	31.00	28.50	28.50	341.35	190.76	11.28	2.82
BH-38	1.20	32.50	30.00	30.00	357.52	204.08	11.28	2.82
BH-38	1.20	34.00	31.50	31.50	373.16	217.41	11.28	2.82
BH-38	1.20	35.00	32.50	32.50	383.59	226.29	11.28	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	3.25	4.00	6.15	12.29	5.65	1.46	18.11	19.57	7.83	6.74
2	4.00	5.50	1.50	Granular	8.19	0.03	24	-	8.00	9.78	1.00	-	4.75	5.50	18.44	24.58	5.65	4.38	31.76	37.60	15.04	10.34
3	5.50	7.00	1.50	Granular	8.19	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	30.73	36.87	5.65	7.61	51.11	64.56	25.83	14.85
4	7.00	8.50	1.50	Granular	8.89	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	43.54	50.21	5.65	10.78	68.06	92.30	36.92	20.24
5	8.50	10.00	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	56.88	63.55	5.65	14.65	102.36	141.25	56.50	26.72
6	10.00	11.50	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	70.22	76.89	5.65	18.08	122.34	179.30	71.72	34.16
7	11.50	13.00	1.50	Granular	8.89	0.07	25	-	10.00	10.88	1.00	-	12.25	13.00	83.56	90.23	5.65	20.69	117.48	195.14	78.06	42.33
8	13.00	14.50	1.50	Granular	9.19	0.07	25	-	10.00	10.88	1.00	-	13.75	14.50	97.13	104.02	5.65	24.05	134.72	236.43	94.57	51.44
9	14.50	16.00	1.50	Granular	9.19	0.03	28	-	15.70	17.82	1.00	-	15.25	16.00	110.92	117.81	5.65	30.76	248.06	380.54	152.21	62.43
10	16.00	17.50	1.50	Granular	9.19	0.03	28	-	15.70	17.82	1.00	-	16.75	17.50	124.71	131.60	5.65	34.59	275.95	443.01	177.20	74.48
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	131.60	131.60	5.65	37.80	311.68	516.53	206.61	87.44
12	19.00	20.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	131.60	131.60	5.65	37.80	311.68	554.34	221.73	100.40
13	20.50	22.00	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	21.25	22.00	131.60	131.60	5.65	36.50	275.95	555.11	222.04	113.00
14	22.00	23.50	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	22.75	23.50	131.60	131.60	5.65	36.50	275.95	591.61	236.64	125.59
15	23.50	25.00	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	24.25	25.00	131.60	131.60	5.65	36.50	275.95	628.11	251.24	138.19
16	25.00	26.50	1.50	Granular	9.19	0.07	28	-	15.70	17.82	1.00	-	25.75	26.50	131.60	131.60	5.65	36.50	275.95	664.61	265.84	150.78
17	26.50	28.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	131.60	131.60	5.65	39.11	347.40	775.16	310.06	164.11
18	28.00	29.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	131.60	131.60	5.65	39.11	347.40	814.27	325.71	177.43
19	29.50	31.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	131.60	131.60	5.65	39.11	347.40	853.37	341.35	190.76
20	31.00	32.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	131.60	131.60	5.65	39.11	348.73	893.80	357.52	204.08
21	32.50	34.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	131.60	131.60	5.65	39.11	348.73	932.91	373.16	217.41
22	34.00	35.00	1.00	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	131.60	131.60	3.77	26.07	348.73	958.98	383.59	226.29

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
2	22.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
3	23.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
4	25.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
5	26.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
6	28.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
7	29.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	31.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	32.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	34.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17
7	35.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-39	-
Chainage	4+425	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	113.46	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-39	1.00	20.50	18.00	18.00	155.02	78.77	9.86	2.46
BH-39	1.00	22.00	19.50	19.50	165.88	88.03	9.86	2.46
BH-39	1.00	23.50	21.00	21.00	176.75	97.28	9.86	2.46
BH-39	1.00	25.00	22.50	22.50	196.54	106.79	9.86	2.46
BH-39	1.00	26.50	24.00	24.00	207.94	116.31	9.86	2.46
BH-39	1.00	28.00	25.50	25.50	219.17	125.83	9.86	2.46
BH-39	1.00	29.50	27.00	27.00	230.41	135.34	9.86	2.46
BH-39	1.00	31.00	28.50	28.50	241.65	144.86	9.86	2.46
BH-39	1.00	32.50	30.00	30.00	252.89	154.37	10.16	2.54
BH-39	1.00	34.00	31.50	31.50	264.13	163.89	10.16	2.54
BH-39	1.00	35.00	32.50	32.50	271.62	170.23	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.72	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	6.54	13.09	4.71	1.24	11.02	12.26	4.90	4.75
2	4.00	5.50	1.50	Granular	8.72	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	19.63	26.17	4.71	3.73	19.98	24.94	9.98	7.44
3	5.50	7.00	1.50	Granular	8.72	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	32.71	39.26	4.71	5.94	24.85	35.76	14.30	10.75
4	7.00	8.50	1.50	Granular	9.69	0.02	22	-	4.00	7.59	1.00	-	7.75	8.50	46.53	53.80	4.71	8.45	33.69	53.05	21.22	14.77
5	8.50	10.00	1.50	Granular	9.69	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	61.07	68.34	4.71	13.11	75.60	108.07	43.23	20.09
6	10.00	11.50	1.50	Granular	9.69	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	75.61	82.88	4.71	16.23	90.72	139.41	55.76	26.28
7	11.50	13.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	90.52	98.17	4.71	20.92	144.16	213.77	85.51	33.78
8	13.00	14.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	105.81	113.46	4.71	24.45	165.63	259.70	103.88	42.28
9	14.50	16.00	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	113.46	113.46	4.71	26.22	165.63	285.92	114.37	51.27
10	16.00	17.50	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	113.46	113.46	4.71	26.22	165.63	312.14	124.86	60.26
11	17.50	19.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	113.46	113.46	4.71	27.16	186.72	360.39	144.16	69.52
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	113.46	113.46	4.71	27.16	186.72	387.55	155.02	78.77
13	20.50	22.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	113.46	113.46	4.71	27.16	186.72	414.71	165.88	88.03
14	22.00	23.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	113.46	113.46	4.71	27.16	186.72	441.87	176.75	97.28
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	113.46	113.46	4.71	28.09	208.13	491.36	196.54	106.79
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	113.46	113.46	4.71	28.09	208.51	519.84	207.94	116.31
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	113.46	113.46	4.71	28.09	208.51	547.94	219.17	125.83
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	113.46	113.46	4.71	28.09	208.51	576.03	230.41	135.34
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	113.46	113.46	4.71	28.09	208.51	604.13	241.65	144.86
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	113.46	113.46	4.71	28.09	208.51	632.22	252.89	154.37
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	113.46	113.46	4.71	28.09	208.51	660.31	264.13	163.89
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	113.46	113.46	3.14	18.73	208.51	679.04	271.62	170.23

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
2	22.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
3	23.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
4	25.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
5	26.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
6	28.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
7	29.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
7	31.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
7	32.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
7	34.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
7	35.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-39	-
Chainage	4+425	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	158.17	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-39	1.20	20.50	18.00	18.00	261.67	111.19	12.91	3.23
BH-39	1.20	22.00	19.50	19.50	279.84	126.29	12.91	3.23
BH-39	1.20	23.50	21.00	21.00	298.02	141.39	12.91	3.23
BH-39	1.20	25.00	22.50	22.50	333.92	156.92	12.91	3.23
BH-39	1.20	26.50	24.00	24.00	352.99	172.46	12.91	3.23
BH-39	1.20	28.00	25.50	25.50	371.79	187.99	12.91	3.23
BH-39	1.20	29.50	27.00	27.00	390.59	203.53	12.91	3.23
BH-39	1.20	31.00	28.50	28.50	409.39	219.06	12.91	3.23
BH-39	1.20	32.50	30.00	30.00	428.19	234.60	13.30	3.32
BH-39	1.20	34.00	31.50	31.50	446.99	250.13	13.30	3.32
BH-39	1.20	35.00	32.50	32.50	459.52	260.49	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.72	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	6.54	13.09	5.65	1.49	16.46	17.95	7.18	6.75
2	4.00	5.50	1.50	Granular	8.72	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	19.63	26.17	5.65	4.47	29.36	35.32	14.13	10.38
3	5.50	7.00	1.50	Granular	8.72	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	32.71	39.26	5.65	7.13	36.18	49.27	19.71	14.75
4	7.00	8.50	1.50	Granular	9.69	0.02	22	-	4.00	7.59	1.00	-	7.75	8.50	46.53	53.80	5.65	10.14	48.96	72.19	28.88	19.96
5	8.50	10.00	1.50	Granular	9.69	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	61.07	68.34	5.65	15.73	110.18	149.13	59.65	26.74
6	10.00	11.50	1.50	Granular	9.69	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	75.61	82.88	5.65	19.47	131.95	190.37	76.15	34.57
7	11.50	13.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	90.52	98.17	5.65	25.11	209.41	292.94	117.18	43.97
8	13.00	14.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	105.81	113.46	5.65	29.35	240.33	353.20	141.28	54.56
9	14.50	16.00	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	121.10	128.75	5.65	33.59	271.25	417.71	167.08	66.34
10	16.00	17.50	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	158.17	158.17	5.65	43.87	330.75	521.08	208.43	81.00
11	17.50	19.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	158.17	158.17	5.65	45.43	372.98	608.74	243.50	96.10
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	158.17	158.17	5.65	45.43	372.98	654.18	261.67	111.19
13	20.50	22.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	158.17	158.17	5.65	45.43	372.98	699.61	279.84	126.29
14	22.00	23.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	158.17	158.17	5.65	45.43	372.98	745.04	298.02	141.39
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	158.17	158.17	5.65	47.00	415.74	834.81	333.92	156.92
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	158.17	158.17	5.65	47.00	416.40	882.47	352.99	172.46
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	158.17	158.17	5.65	47.00	416.40	929.47	371.79	187.99
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	158.17	158.17	5.65	47.00	416.40	976.47	390.59	203.53
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	158.17	158.17	5.65	47.00	416.40	1023.47	409.39	219.06
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	158.17	158.17	5.65	47.00	416.40	1070.47	428.19	234.60
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	158.17	158.17	5.65	47.00	416.40	1117.48	446.99	250.13
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	158.17	158.17	3.77	31.33	416.40	1148.81	459.52	260.49

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
2	22.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
3	23.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
4	25.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
5	26.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
6	28.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
7	29.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
7	31.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
7	32.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
7	34.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
7	35.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-40	-
Chainage	4+518	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	113.32	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-40	1.00	20.50	18.00	18.00	156.56	79.81	11.85	2.96
BH-40	1.00	22.00	19.50	19.50	167.41	89.06	12.12	3.03
BH-40	1.00	23.50	21.00	21.00	178.26	98.30	12.39	3.10
BH-40	1.00	25.00	22.50	22.50	189.11	107.54	12.39	3.10
BH-40	1.00	26.50	24.00	24.00	208.90	117.05	12.65	3.16
BH-40	1.00	28.00	25.50	25.50	220.12	126.56	12.65	3.16
BH-40	1.00	29.50	27.00	27.00	231.35	136.06	12.65	3.16
BH-40	1.00	31.00	28.50	28.50	242.57	145.57	12.65	3.16
BH-40	1.00	32.50	30.00	30.00	253.80	155.08	12.65	3.16
BH-40	1.00	34.00	31.50	31.50	265.02	164.58	12.65	3.16
BH-40	1.00	35.00	32.50	32.50	272.50	170.92	12.65	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.19	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	6.90	13.79	4.71	1.31	11.61	12.92	5.17	4.76
2	4.00	5.50	1.50	Granular	9.19	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	20.69	27.58	4.71	3.93	21.05	26.29	10.52	7.51
3	5.50	7.00	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	34.48	41.37	4.71	7.40	47.33	59.96	23.99	11.23
4	7.00	8.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	48.27	55.16	4.71	10.36	61.67	84.66	33.86	15.78
5	8.50	10.00	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	62.06	68.95	4.71	13.32	76.01	112.32	44.93	21.16
6	10.00	11.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	75.85	82.74	4.71	16.28	90.35	142.94	57.17	27.37
7	11.50	13.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	90.39	98.03	4.71	20.89	143.97	217.45	86.98	34.87
8	13.00	14.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	105.68	113.32	4.71	24.42	165.44	263.34	105.34	43.36
9	14.50	16.00	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	113.32	113.32	4.71	26.19	165.44	289.53	115.81	52.34
10	16.00	17.50	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	113.32	113.32	4.71	26.19	165.44	315.73	126.29	61.32
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	113.32	113.32	4.71	27.13	186.86	364.27	145.71	70.57
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	113.32	113.32	4.71	27.13	186.86	391.39	156.56	79.81
13	20.50	22.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	113.32	113.32	4.71	27.13	186.86	418.52	167.41	89.06
14	22.00	23.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	113.32	113.32	4.71	27.13	186.86	445.64	178.26	98.30
15	23.50	25.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	113.32	113.32	4.71	27.13	186.86	472.77	189.11	107.54
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	113.32	113.32	4.71	28.06	208.27	522.25	208.90	117.05
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	113.32	113.32	4.71	28.06	208.27	550.31	220.12	126.56
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	113.32	113.32	4.71	28.06	208.27	578.37	231.35	136.06
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	113.32	113.32	4.71	28.06	208.27	606.43	242.57	145.57
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	113.32	113.32	4.71	28.06	208.27	634.49	253.80	155.08
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	113.32	113.32	4.71	28.06	208.27	662.55	265.02	164.58
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	113.32	113.32	3.14	18.71	208.27	681.26	272.50	170.92

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	32.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	34.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	35.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-40	-
Chainage	4+518	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	143.90	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-40	1.20	20.50	18.00	18.00	244.99	108.48	15.51	3.88
BH-40	1.20	22.00	19.50	19.50	261.52	122.43	15.86	3.96
BH-40	1.20	23.50	21.00	21.00	278.05	136.37	16.20	4.05
BH-40	1.20	25.00	22.50	22.50	294.59	150.32	16.20	4.05
BH-40	1.20	26.50	24.00	24.00	327.33	164.67	16.54	4.14
BH-40	1.20	28.00	25.50	25.50	344.43	179.02	16.54	4.14
BH-40	1.20	29.50	27.00	27.00	361.53	193.37	16.54	4.14
BH-40	1.20	31.00	28.50	28.50	378.64	207.71	16.54	4.14
BH-40	1.20	32.50	30.00	30.00	395.74	222.06	16.54	4.14
BH-40	1.20	34.00	31.50	31.50	412.85	236.41	16.54	4.14
BH-40	1.20	35.00	32.50	32.50	424.25	245.98	16.54	4.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.19	0.07	23	-	6.00	8.68	1.00	-	3.25	4.00	6.90	13.79	5.65	1.57	17.35	18.92	7.57	6.77
2	4.00	5.50	1.50	Granular	9.19	0.07	23	-	6.00	8.68	1.00	-	4.75	5.50	20.69	27.58	5.65	4.71	30.94	37.22	14.89	10.47
3	5.50	7.00	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	34.48	41.37	5.65	8.88	69.40	84.56	33.82	15.33
4	7.00	8.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	48.27	55.16	5.65	12.43	90.04	117.64	47.05	21.18
5	8.50	10.00	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	62.06	68.95	5.65	15.98	110.69	154.27	61.71	28.03
6	10.00	11.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	75.85	82.74	5.65	19.53	131.34	194.45	77.78	35.88
7	11.50	13.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	90.39	98.03	5.65	25.07	209.14	297.31	118.92	45.27
8	13.00	14.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	105.68	113.32	5.65	29.31	240.05	357.54	143.01	55.85
9	14.50	16.00	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	120.97	128.61	5.65	33.55	270.97	422.00	168.80	67.62
10	16.00	17.50	1.50	Granular	10.19	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	136.26	143.90	5.65	37.79	301.89	490.71	196.29	80.58
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	143.90	143.90	5.65	41.34	340.97	571.13	228.45	94.53
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	143.90	143.90	5.65	41.34	340.97	612.47	244.99	108.48
13	20.50	22.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	143.90	143.90	5.65	41.34	340.97	653.80	261.52	122.43
14	22.00	23.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	143.90	143.90	5.65	41.34	340.97	695.14	278.05	136.37
15	23.50	25.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	143.90	143.90	5.65	41.34	340.97	736.47	294.59	150.32
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	143.90	143.90	5.65	42.76	380.06	818.31	327.33	164.67
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	143.90	143.90	5.65	42.76	380.06	861.07	344.43	179.02
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	143.90	143.90	5.65	42.76	380.06	903.83	361.53	193.37
19	29.50	31.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	30.25	31.00	143.90	143.90	5.65	42.76	380.06	946.59	378.64	207.71
20	31.00	32.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	31.75	32.50	143.90	143.90	5.65	42.76	380.06	989.36	395.74	222.06
21	32.50	34.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	33.25	34.00	143.90	143.90	5.65	42.76	380.06	1032.12	412.85	236.41
22	34.00	35.00	1.00	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	34.50	35.00	143.90	143.90	3.77	28.51	380.06	1060.62	424.25	245.98

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	32.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	34.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	35.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61

A.6. Zone 6: CH: 4+515 km to 5+530 km (BH-41 to BH-50)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-41	1.00	20.50	18.00	16.50	328.22	139.04	13.23	3.31	156.39	77.05	13.23	3.31
BH-41	1.00	22.00	19.50	18.00	350.43	156.24	13.52	3.38	166.95	86.09	13.52	3.38
BH-41	1.00	23.50	21.00	19.50	372.65	173.44	13.52	3.38	177.51	95.13	13.52	3.38
BH-41	1.00	25.00	22.50	21.00	394.86	190.64	13.52	3.38	188.07	104.17	13.52	3.38
BH-41	1.00	26.50	24.00	22.50	417.08	207.84	13.81	3.45	198.63	113.21	13.81	3.45
BH-41	1.00	28.00	25.50	24.00	439.29	225.04	13.81	3.45	209.19	122.25	13.81	3.45
BH-41	1.00	29.50	27.00	25.50	461.51	242.24	13.81	3.45	219.75	131.29	13.81	3.45
BH-41	1.00	31.00	28.50	27.00	483.72	259.44	13.81	3.45	230.31	140.33	13.81	3.45
BH-41	1.00	32.50	30.00	28.50	505.94	276.64	13.81	3.45	240.86	149.37	13.81	3.45
BH-41	1.00	34.00	31.50	30.00	528.15	293.84	13.81	3.45	251.42	158.41	13.81	3.45
BH-41	1.00	35.00	32.50	31.00	542.96	305.31	13.81	3.45	258.46	164.44	13.81	3.45
BH-41	1.20	20.50	18.00	16.50	475.27	179.83	17.20	4.30	249.10	105.43	17.20	4.30
BH-41	1.20	22.00	19.50	18.00	505.53	203.38	17.58	4.40	265.37	119.20	17.58	4.40
BH-41	1.20	23.50	21.00	19.50	535.79	226.94	17.58	4.40	281.65	132.97	17.58	4.40
BH-41	1.20	25.00	22.50	21.00	566.05	250.50	17.58	4.40	297.92	146.73	17.58	4.40
BH-41	1.20	26.50	24.00	22.50	596.32	274.06	17.96	4.49	314.19	160.50	17.96	4.49
BH-41	1.20	28.00	25.50	24.00	626.58	297.61	17.96	4.49	330.47	174.26	17.96	4.49
BH-41	1.20	29.50	27.00	25.50	656.84	321.17	17.96	4.49	346.74	188.03	17.96	4.49
BH-41	1.20	31.00	28.50	27.00	687.10	344.73	17.96	4.49	363.01	201.80	17.96	4.49

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-41	1.20	32.50	30.00	28.50	717.36	368.29	17.96	4.49	379.29	215.56	17.96	4.49
BH-41	1.20	34.00	31.50	30.00	747.62	391.85	17.96	4.49	395.56	229.33	17.96	4.49
BH-41	1.20	35.00	32.50	31.00	767.79	407.55	17.96	4.49	406.41	238.51	17.96	4.49
BH-42	1.00	20.50	18.00	16.50	306.10	133.26	13.52	3.38	151.12	75.77	13.52	3.38
BH-42	1.00	22.00	19.50	18.00	326.37	149.10	13.52	3.38	161.19	84.47	13.52	3.38
BH-42	1.00	23.50	21.00	19.50	346.65	164.94	13.81	3.45	171.27	93.17	13.81	3.45
BH-42	1.00	25.00	22.50	21.00	366.92	180.78	13.81	3.45	181.34	101.88	13.81	3.45
BH-42	1.00	26.50	24.00	22.50	387.20	196.63	13.81	3.45	191.42	110.58	13.81	3.45
BH-42	1.00	28.00	25.50	24.00	407.47	212.47	14.09	3.52	201.50	119.28	14.09	3.52
BH-42	1.00	29.50	27.00	25.50	427.75	228.31	14.09	3.52	211.57	127.98	14.09	3.52
BH-42	1.00	31.00	28.50	27.00	448.02	244.15	14.09	3.52	221.65	136.69	14.09	3.52
BH-42	1.00	32.50	30.00	28.50	468.30	259.99	14.09	3.52	231.72	145.39	14.09	3.52
BH-42	1.00	34.00	31.50	30.00	488.57	275.84	14.09	3.52	241.80	154.09	14.09	3.52
BH-42	1.00	35.00	32.50	31.00	502.09	286.40	14.09	3.52	248.52	159.89	14.09	3.52
BH-42	1.20	20.50	18.00	16.50	445.28	172.80	17.58	4.40	241.82	103.81	17.58	4.40
BH-42	1.20	22.00	19.50	18.00	473.22	194.73	17.58	4.40	257.51	117.17	17.58	4.40
BH-42	1.20	23.50	21.00	19.50	501.15	216.66	17.96	4.49	273.21	130.53	17.96	4.49
BH-42	1.20	25.00	22.50	21.00	529.08	238.59	17.96	4.49	288.90	143.89	17.96	4.49
BH-42	1.20	26.50	24.00	22.50	557.01	260.51	17.96	4.49	304.60	157.26	17.96	4.49
BH-42	1.20	28.00	25.50	24.00	584.95	282.44	18.33	4.58	320.29	170.62	18.33	4.58
BH-42	1.20	29.50	27.00	25.50	612.88	304.37	18.33	4.58	335.98	183.98	18.33	4.58
BH-42	1.20	31.00	28.50	27.00	640.81	326.30	18.33	4.58	351.68	197.34	18.33	4.58
BH-42	1.20	32.50	30.00	28.50	668.75	348.23	18.33	4.58	367.37	210.70	18.33	4.58
BH-42	1.20	34.00	31.50	30.00	696.68	370.15	18.33	4.58	383.07	224.06	18.33	4.58
BH-42	1.20	35.00	32.50	31.00	715.30	384.77	18.33	4.58	393.53	232.97	18.33	4.58

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-43	1.00	20.50	18.00	18.00	260.05	130.16	11.85	2.96	132.20	75.90	11.85	2.96
BH-43	1.00	22.00	19.50	19.50	312.09	146.08	12.12	3.03	159.37	84.92	12.12	3.03
BH-43	1.00	23.50	21.00	21.00	332.49	162.01	12.39	3.10	169.91	93.94	12.39	3.10
BH-43	1.00	25.00	22.50	22.50	352.88	177.93	12.65	3.16	180.44	102.97	12.65	3.16
BH-43	1.00	26.50	24.00	24.00	373.27	193.86	12.65	3.16	190.97	111.99	12.65	3.16
BH-43	1.00	28.00	25.50	25.50	410.19	210.27	12.91	3.23	210.19	121.27	12.91	3.23
BH-43	1.00	29.50	27.00	27.00	431.29	226.69	12.91	3.23	221.09	130.54	12.91	3.23
BH-43	1.00	31.00	28.50	28.50	452.38	243.10	12.91	3.23	231.98	139.82	12.91	3.23
BH-43	1.00	32.50	30.00	30.00	473.48	259.52	12.91	3.23	242.88	149.10	12.91	3.23
BH-43	1.00	34.00	31.50	31.50	494.58	275.94	12.91	3.23	253.77	158.37	12.91	3.23
BH-43	1.00	35.00	32.50	32.50	508.64	286.88	12.91	3.23	261.04	164.56	12.91	3.23
BH-43	1.20	20.50	18.00	18.00	369.38	168.49	15.51	3.88	203.89	103.38	15.51	3.88
BH-43	1.20	22.00	19.50	19.50	449.46	190.44	15.86	3.96	250.51	117.04	15.86	3.96
BH-43	1.20	23.50	21.00	21.00	477.41	212.38	16.20	4.05	266.63	130.70	16.20	4.05
BH-43	1.20	25.00	22.50	22.50	505.37	234.32	16.54	4.14	282.76	144.36	16.54	4.14
BH-43	1.20	26.50	24.00	24.00	533.32	256.26	16.54	4.14	298.88	158.02	16.54	4.14
BH-43	1.20	28.00	25.50	25.50	588.30	278.88	16.88	4.22	330.81	172.07	16.88	4.22
BH-43	1.20	29.50	27.00	27.00	617.21	301.50	16.88	4.22	347.49	186.12	16.88	4.22
BH-43	1.20	31.00	28.50	28.50	646.13	324.12	16.88	4.22	364.16	200.17	16.88	4.22
BH-43	1.20	32.50	30.00	30.00	675.05	346.73	16.88	4.22	380.84	214.22	16.88	4.22
BH-43	1.20	34.00	31.50	31.50	703.97	369.35	16.88	4.22	397.52	228.27	16.88	4.22
BH-43	1.20	35.00	32.50	32.50	723.24	384.43	16.88	4.22	408.64	237.64	16.88	4.22
BH-44	1.00	20.50	18.00	18.00	301.34	136.87	11.58	2.89	153.82	79.35	11.58	2.89
BH-44	1.00	22.00	19.50	19.50	338.28	153.29	11.85	2.96	173.05	88.63	11.85	2.96
BH-44	1.00	23.50	21.00	21.00	359.39	169.71	12.12	3.03	183.96	97.91	12.12	3.03

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-44	1.00	25.00	22.50	22.50	380.49	186.14	12.39	3.10	194.86	107.19	12.39	3.10
BH-44	1.00	26.50	24.00	24.00	401.60	202.56	12.39	3.10	205.77	116.48	12.39	3.10
BH-44	1.00	28.00	25.50	25.50	422.70	218.98	12.65	3.16	216.67	125.76	12.65	3.16
BH-44	1.00	29.50	27.00	27.00	443.80	235.40	12.65	3.16	227.58	135.04	12.65	3.16
BH-44	1.00	31.00	28.50	28.50	464.91	251.83	12.65	3.16	238.48	144.33	12.65	3.16
BH-44	1.00	32.50	30.00	30.00	486.01	268.25	12.65	3.16	249.39	153.61	12.65	3.16
BH-44	1.00	34.00	31.50	31.50	507.12	284.67	12.65	3.16	260.29	162.89	12.65	3.16
BH-44	1.00	35.00	32.50	32.50	521.19	295.62	12.65	3.16	267.56	169.08	12.65	3.16
BH-44	1.20	20.50	18.00	18.00	433.69	176.97	15.15	3.79	240.98	107.94	15.15	3.79
BH-44	1.20	22.00	19.50	19.50	488.69	199.59	15.51	3.88	272.93	121.99	15.51	3.88
BH-44	1.20	23.50	21.00	21.00	517.62	222.22	15.86	3.96	289.62	136.05	15.86	3.96
BH-44	1.20	25.00	22.50	22.50	546.54	244.84	16.20	4.05	306.31	150.11	16.20	4.05
BH-44	1.20	26.50	24.00	24.00	575.47	267.46	16.20	4.05	323.00	164.17	16.20	4.05
BH-44	1.20	28.00	25.50	25.50	604.40	290.09	16.54	4.14	339.68	178.22	16.54	4.14
BH-44	1.20	29.50	27.00	27.00	633.33	312.71	16.54	4.14	356.37	192.28	16.54	4.14
BH-44	1.20	31.00	28.50	28.50	662.26	335.34	16.54	4.14	373.06	206.34	16.54	4.14
BH-44	1.20	32.50	30.00	30.00	691.18	357.96	16.54	4.14	389.75	220.40	16.54	4.14
BH-44	1.20	34.00	31.50	31.50	720.11	380.59	16.54	4.14	406.44	234.45	16.54	4.14
BH-44	1.20	35.00	32.50	32.50	739.40	395.67	16.54	4.14	417.57	243.82	16.54	4.14
BH-45	1.00	20.50	18.00	18.00	289.30	131.83	11.30	2.83	142.50	74.81	11.30	2.83
BH-45	1.00	22.00	19.50	19.50	324.92	147.72	11.58	2.89	160.42	83.57	11.58	2.89
BH-45	1.00	23.50	21.00	21.00	345.27	163.61	11.58	2.89	170.57	92.32	11.58	2.89
BH-45	1.00	25.00	22.50	22.50	365.55	179.51	11.58	2.89	180.65	101.07	11.58	2.89
BH-45	1.00	26.50	24.00	24.00	385.90	195.40	11.58	2.89	190.80	109.83	11.58	2.89
BH-45	1.00	28.00	25.50	25.50	406.25	211.29	11.85	2.96	200.95	118.58	11.85	2.96

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-45	1.00	29.50	27.00	27.00	426.66	227.19	11.85	2.96	211.17	127.33	11.85	2.96
BH-45	1.00	31.00	28.50	28.50	447.01	243.08	11.85	2.96	221.31	136.09	11.85	2.96
BH-45	1.00	32.50	30.00	30.00	467.36	258.97	12.12	3.03	231.46	144.84	12.12	3.03
BH-45	1.00	34.00	31.50	31.50	487.71	274.86	12.12	3.03	241.61	153.60	12.12	3.03
BH-45	1.00	35.00	32.50	32.50	501.27	285.46	12.12	3.03	248.38	159.43	12.12	3.03
BH-45	1.20	20.50	18.00	18.00	418.07	170.92	14.79	3.70	226.23	102.50	14.79	3.70
BH-45	1.20	22.00	19.50	19.50	471.36	192.91	15.15	3.79	256.47	115.92	15.15	3.79
BH-45	1.20	23.50	21.00	21.00	499.38	214.90	15.15	3.79	272.26	129.34	15.15	3.79
BH-45	1.20	25.00	22.50	22.50	527.29	236.88	15.15	3.79	287.93	142.77	15.15	3.79
BH-45	1.20	26.50	24.00	24.00	555.31	258.87	15.15	3.79	303.71	156.19	15.15	3.79
BH-45	1.20	28.00	25.50	25.50	583.33	280.86	15.51	3.88	319.49	169.61	15.51	3.88
BH-45	1.20	29.50	27.00	27.00	611.46	302.85	15.51	3.88	335.38	183.03	15.51	3.88
BH-45	1.20	31.00	28.50	28.50	639.48	324.84	15.51	3.88	351.16	196.45	15.51	3.88
BH-45	1.20	32.50	30.00	30.00	667.50	346.83	15.86	3.96	366.94	209.88	15.86	3.96
BH-45	1.20	34.00	31.50	31.50	695.52	368.82	15.86	3.96	382.73	223.30	15.86	3.96
BH-45	1.20	35.00	32.50	32.50	714.20	383.48	15.86	3.96	393.25	232.25	15.86	3.96
BH-45A	1.00	22.00	19.50	16.50	273.22	136.30	10.36	2.59	129.03	75.85	10.36	2.59
BH-45A	1.00	23.50	21.00	18.00	291.43	150.69	10.36	2.59	137.71	83.58	10.36	2.59
BH-45A	1.00	25.00	22.50	19.50	309.63	165.09	10.73	2.68	146.40	91.31	10.73	2.68
BH-45A	1.00	26.50	24.00	21.00	358.51	180.39	11.10	2.77	170.06	99.48	11.10	2.77
BH-45A	1.00	28.00	25.50	22.50	378.01	195.69	11.45	2.86	179.37	107.64	11.45	2.86
BH-45A	1.00	29.50	27.00	24.00	397.52	211.00	11.45	2.86	188.67	115.80	11.45	2.86
BH-45A	1.00	30.00	27.50	24.50	404.02	216.10	11.80	2.95	191.78	118.52	11.80	2.95
BH-45A	1.20	22.00	19.50	16.50	388.59	177.57	13.46	3.36	201.68	105.03	13.46	3.36
BH-45A	1.20	23.50	21.00	18.00	413.34	197.27	13.46	3.36	215.00	116.73	13.46	3.36

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-45A	1.20	25.00	22.50	19.50	438.09	216.97	13.94	3.49	228.33	128.44	13.94	3.49
BH-45A	1.20	26.50	24.00	21.00	512.58	237.90	14.41	3.60	268.96	140.81	14.41	3.60
BH-45A	1.20	28.00	25.50	22.50	539.10	258.84	14.88	3.72	283.24	153.18	14.88	3.72
BH-45A	1.20	29.50	27.00	24.00	565.62	279.78	14.88	3.72	297.52	165.55	14.88	3.72
BH-45A	1.20	30.00	27.50	24.50	574.46	286.76	15.33	3.83	302.28	169.67	15.33	3.83
BH-46	1.00	20.50	18.00	16.50	272.28	120.72	10.40	2.60	137.39	70.01	10.40	2.60
BH-46	1.00	22.00	19.50	18.00	290.33	135.00	10.73	2.68	146.70	78.17	10.73	2.68
BH-46	1.00	23.50	21.00	19.50	308.38	149.28	11.06	2.77	156.01	86.34	11.06	2.77
BH-46	1.00	25.00	22.50	21.00	326.42	163.57	11.38	2.85	165.31	94.50	11.38	2.85
BH-46	1.00	26.50	24.00	22.50	344.47	177.85	11.70	2.93	174.62	102.67	11.70	2.93
BH-46	1.00	28.00	25.50	24.00	362.52	192.14	11.70	2.93	183.93	110.83	11.70	2.93
BH-46	1.00	29.50	27.00	25.50	380.57	206.42	12.01	3.00	193.23	118.99	12.01	3.00
BH-46	1.00	31.00	28.50	27.00	398.62	220.70	12.01	3.00	202.54	127.16	12.01	3.00
BH-46	1.00	32.50	30.00	28.50	416.67	234.99	12.32	3.08	211.85	135.32	12.32	3.08
BH-46	1.00	34.00	31.50	30.00	434.72	249.27	12.32	3.08	221.15	143.48	12.32	3.08
BH-46	1.00	35.00	32.50	31.00	446.75	258.79	12.32	3.08	227.36	148.93	12.32	3.08
BH-46	1.20	20.50	18.00	16.50	400.88	157.75	13.53	3.38	224.03	96.90	13.53	3.38
BH-46	1.20	22.00	19.50	18.00	426.14	177.81	13.97	3.49	238.81	109.62	13.97	3.49
BH-46	1.20	23.50	21.00	19.50	451.40	197.87	14.39	3.60	253.58	122.33	14.39	3.60
BH-46	1.20	25.00	22.50	21.00	476.67	217.93	14.81	3.70	268.35	135.05	14.81	3.70
BH-46	1.20	26.50	24.00	22.50	501.93	237.98	15.22	3.81	283.12	147.76	15.22	3.81
BH-46	1.20	28.00	25.50	24.00	527.19	258.04	15.22	3.81	297.89	160.48	15.22	3.81
BH-46	1.20	29.50	27.00	25.50	552.45	278.10	15.63	3.91	312.66	173.19	15.63	3.91
BH-46	1.20	31.00	28.50	27.00	577.71	298.16	15.63	3.91	327.43	185.90	15.63	3.91
BH-46	1.20	32.50	30.00	28.50	602.97	318.22	16.03	4.01	342.20	198.62	16.03	4.01

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-46	1.20	34.00	31.50	30.00	628.23	338.27	16.03	4.01	356.97	211.33	16.03	4.01
BH-46	1.20	35.00	32.50	31.00	645.07	351.65	16.03	4.01	366.82	219.81	16.03	4.01
BH-48	1.00	20.50	18.00	18.00	284.77	128.95	12.12	3.03	140.53	73.72	12.12	3.03
BH-48	1.00	22.00	19.50	19.50	320.28	144.80	12.12	3.03	158.33	82.43	12.12	3.03
BH-48	1.00	23.50	21.00	21.00	340.57	160.65	12.39	3.10	168.42	91.14	12.39	3.10
BH-48	1.00	25.00	22.50	22.50	360.85	176.50	12.39	3.10	178.50	99.85	12.39	3.10
BH-48	1.00	26.50	24.00	24.00	381.13	192.34	12.65	3.16	188.58	108.56	12.65	3.16
BH-48	1.00	28.00	25.50	25.50	401.42	208.19	12.65	3.16	198.67	117.26	12.65	3.16
BH-48	1.00	29.50	27.00	27.00	421.70	224.04	12.65	3.16	208.75	125.97	12.65	3.16
BH-48	1.00	31.00	28.50	28.50	441.98	239.88	12.65	3.16	218.83	134.68	12.65	3.16
BH-48	1.00	32.50	30.00	30.00	462.26	255.73	12.91	3.23	228.92	143.39	12.91	3.23
BH-48	1.00	34.00	31.50	31.50	482.55	271.58	12.91	3.23	239.00	152.09	12.91	3.23
BH-48	1.00	35.00	32.50	32.50	496.07	282.14	12.91	3.23	245.72	157.90	12.91	3.23
BH-48	1.20	20.50	18.00	18.00	412.48	167.43	15.86	3.96	223.70	101.15	15.86	3.96
BH-48	1.20	22.00	19.50	19.50	465.62	189.36	15.86	3.96	253.80	114.52	15.86	3.96
BH-48	1.20	23.50	21.00	21.00	493.56	211.29	16.20	4.05	269.50	127.88	16.20	4.05
BH-48	1.20	25.00	22.50	22.50	521.51	233.23	16.20	4.05	285.20	141.25	16.20	4.05
BH-48	1.20	26.50	24.00	24.00	549.45	255.16	16.54	4.14	300.91	154.62	16.54	4.14
BH-48	1.20	28.00	25.50	25.50	577.39	277.10	16.54	4.14	316.61	167.99	16.54	4.14
BH-48	1.20	29.50	27.00	27.00	605.33	299.03	16.54	4.14	332.31	181.35	16.54	4.14
BH-48	1.20	31.00	28.50	28.50	633.27	320.97	16.54	4.14	348.01	194.72	16.54	4.14
BH-48	1.20	32.50	30.00	30.00	661.22	342.90	16.88	4.22	363.72	208.09	16.88	4.22
BH-48	1.20	34.00	31.50	31.50	689.16	364.84	16.88	4.22	379.42	221.45	16.88	4.22
BH-48	1.20	35.00	32.50	32.50	707.79	379.46	16.88	4.22	389.89	230.37	16.88	4.22
BH-49	1.00	20.50	18.00	18.00	286.44	130.75	10.74	2.68	139.99	73.97	10.74	2.68

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-49	1.00	22.00	19.50	19.50	305.91	146.03	11.02	2.76	149.60	82.35	11.02	2.76
BH-49	1.00	23.50	21.00	21.00	325.38	161.31	11.58	2.89	159.21	90.73	11.58	2.89
BH-49	1.00	25.00	22.50	22.50	344.80	176.59	11.58	2.89	168.76	99.11	11.58	2.89
BH-49	1.00	26.50	24.00	24.00	364.27	191.87	11.85	2.96	178.38	107.48	11.85	2.96
BH-49	1.00	28.00	25.50	25.50	383.74	207.15	11.85	2.96	187.99	115.86	11.85	2.96
BH-49	1.00	29.50	27.00	27.00	419.07	222.90	11.85	2.96	205.61	124.47	11.85	2.96
BH-49	1.00	31.00	28.50	28.50	439.21	238.64	11.85	2.96	215.56	133.08	11.85	2.96
BH-49	1.00	32.50	30.00	30.00	459.36	254.39	12.12	3.03	225.50	141.69	12.12	3.03
BH-49	1.00	34.00	31.50	31.50	479.50	270.14	12.12	3.03	235.44	150.30	12.12	3.03
BH-49	1.00	35.00	32.50	32.50	492.93	280.64	12.12	3.03	242.07	156.04	12.12	3.03
BH-49	1.20	20.50	18.00	18.00	414.33	169.62	14.06	3.51	222.90	101.49	14.06	3.51
BH-49	1.20	22.00	19.50	19.50	441.18	190.79	14.43	3.61	237.92	114.38	14.43	3.61
BH-49	1.20	23.50	21.00	21.00	468.03	211.96	15.15	3.79	252.93	127.26	15.15	3.79
BH-49	1.20	25.00	22.50	22.50	494.77	233.13	15.15	3.79	267.85	140.15	15.15	3.79
BH-49	1.20	26.50	24.00	24.00	521.62	254.30	15.51	3.88	282.87	153.04	15.51	3.88
BH-49	1.20	28.00	25.50	25.50	548.47	275.47	15.51	3.88	297.89	165.93	15.51	3.88
BH-49	1.20	29.50	27.00	27.00	601.40	297.28	15.51	3.88	327.76	179.18	15.51	3.88
BH-49	1.20	31.00	28.50	28.50	629.17	319.10	15.51	3.88	343.30	192.43	15.51	3.88
BH-49	1.20	32.50	30.00	30.00	656.95	340.92	15.86	3.96	358.84	205.68	15.86	3.96
BH-49	1.20	34.00	31.50	31.50	684.72	362.74	15.86	3.96	374.37	218.93	15.86	3.96
BH-49	1.20	35.00	32.50	32.50	703.24	377.28	15.86	3.96	384.73	227.76	15.86	3.96
BH-50	1.00	20.50	18.00	16.50	252.56	127.56	11.70	2.93	123.57	72.50	11.70	2.93
BH-50	1.00	22.00	19.50	18.00	286.81	142.50	12.01	3.00	140.79	80.77	12.01	3.00
BH-50	1.00	23.50	21.00	19.50	305.79	157.44	12.32	3.08	150.26	89.05	12.32	3.08
BH-50	1.00	25.00	22.50	21.00	324.78	172.37	12.63	3.16	159.72	97.32	12.63	3.16

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-50	1.00	26.50	24.00	22.50	343.76	187.31	12.63	3.16	169.19	105.60	12.63	3.16
BH-50	1.00	28.00	25.50	24.00	394.70	203.20	12.93	3.23	194.92	114.35	12.93	3.23
BH-50	1.00	29.50	27.00	25.50	415.04	219.09	12.93	3.23	205.06	123.10	12.93	3.23
BH-50	1.00	31.00	28.50	27.00	435.38	234.98	12.93	3.23	215.20	131.84	12.93	3.23
BH-50	1.00	32.50	30.00	28.50	455.72	250.86	13.23	3.31	225.34	140.59	13.23	3.31
BH-50	1.00	34.00	31.50	30.00	476.06	266.75	13.23	3.31	235.48	149.34	13.23	3.31
BH-50	1.00	35.00	32.50	31.00	489.62	277.34	13.23	3.31	242.24	155.17	13.23	3.31
BH-50	1.20	20.50	18.00	16.50	359.30	165.40	15.22	3.81	192.43	99.33	15.22	3.81
BH-50	1.20	22.00	19.50	18.00	410.62	186.05	15.63	3.91	221.52	111.98	15.63	3.91
BH-50	1.20	23.50	21.00	19.50	436.73	206.70	16.03	4.01	236.21	124.64	16.03	4.01
BH-50	1.20	25.00	22.50	21.00	462.84	227.35	16.43	4.11	250.89	137.29	16.43	4.11
BH-50	1.20	26.50	24.00	22.50	488.95	248.00	16.43	4.11	265.58	149.95	16.43	4.11
BH-50	1.20	28.00	25.50	24.00	567.47	269.96	16.82	4.20	310.24	163.34	16.82	4.20
BH-50	1.20	29.50	27.00	25.50	595.44	291.92	16.82	4.20	325.98	176.73	16.82	4.20
BH-50	1.20	31.00	28.50	27.00	623.42	313.87	16.82	4.20	341.71	190.12	16.82	4.20
BH-50	1.20	32.50	30.00	28.50	651.39	335.83	17.20	4.30	357.45	203.50	17.20	4.30
BH-50	1.20	34.00	31.50	30.00	679.36	357.79	17.20	4.30	373.18	216.89	17.20	4.30
BH-50	1.20	35.00	32.50	31.00	698.01	372.43	17.20	4.30	383.67	225.82	17.20	4.30

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-41	-
Chainage	4+617	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	224.28	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	14.69	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-41	1.00	20.50	18.00	16.50	328.22	139.04	13.23	3.31
BH-41	1.00	22.00	19.50	18.00	350.43	156.24	13.52	3.38
BH-41	1.00	23.50	21.00	19.50	372.65	173.44	13.52	3.38
BH-41	1.00	25.00	22.50	21.00	394.86	190.64	13.52	3.38
BH-41	1.00	26.50	24.00	22.50	417.08	207.84	13.81	3.45
BH-41	1.00	28.00	25.50	24.00	439.29	225.04	13.81	3.45
BH-41	1.00	29.50	27.00	25.50	461.51	242.24	13.81	3.45
BH-41	1.00	31.00	28.50	27.00	483.72	259.44	13.81	3.45
BH-41	1.00	32.50	30.00	28.50	505.94	276.64	13.81	3.45
BH-41	1.00	34.00	31.50	30.00	528.15	293.84	13.81	3.45
BH-41	1.00	35.00	32.50	31.00	542.96	305.31	13.81	3.45

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	4.71	7.94	50.73	58.67	23.47	8.27
3	5.50	7.00	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	65.20	79.10	4.71	13.45	75.13	96.53	38.61	13.69
4	7.00	8.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	92.99	106.89	4.71	19.19	98.97	139.55	55.82	20.71
5	8.50	10.00	1.50	Granular	18.53	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	120.79	134.69	4.71	26.92	174.67	242.17	96.87	29.90
6	10.00	11.50	1.50	Granular	19.91	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	149.62	164.55	4.71	33.34	211.92	312.77	125.11	40.88
7	11.50	13.00	1.50	Granular	19.91	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	179.48	194.42	4.71	42.96	322.26	466.07	186.43	54.56
8	13.00	14.50	1.50	Granular	19.91	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	209.35	224.28	4.71	50.11	369.64	563.56	225.43	70.24
9	14.50	16.00	1.50	Granular	10.10	0.03	30	-	19.50	22.44	1.00	-	15.25	16.00	224.28	224.28	4.71	55.54	404.47	653.93	261.57	87.44
10	16.00	17.50	1.50	Granular	10.10	0.03	30	-	19.50	22.44	1.00	-	16.75	17.50	224.28	224.28	4.71	55.54	404.47	709.47	283.79	104.64
11	17.50	19.00	1.50	Granular	10.10	0.07	30	-	19.50	22.44	1.00	-	18.25	19.00	224.28	224.28	4.71	55.54	404.47	765.00	306.00	121.84
12	19.00	20.50	1.50	Granular	10.10	0.07	30	-	19.50	22.44	1.00	-	19.75	20.50	224.28	224.28	4.71	55.54	404.47	820.54	328.22	139.04
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	224.28	224.28	4.71	55.54	404.47	876.08	350.43	156.24
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	224.28	224.28	4.71	55.54	404.47	931.62	372.65	173.44
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	224.28	224.28	4.71	55.54	404.47	987.16	394.86	190.64
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	224.28	224.28	4.71	55.54	404.47	1042.69	417.08	207.84
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	224.28	224.28	4.71	55.54	404.47	1098.23	439.29	225.04
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	224.28	224.28	4.71	55.54	404.47	1153.77	461.51	242.24
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	224.28	224.28	4.71	55.54	404.47	1209.31	483.72	259.44
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	224.28	224.28	4.71	55.54	404.47	1264.85	505.94	276.64
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	224.28	224.28	4.71	55.54	404.47	1320.38	528.15	293.84
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	224.28	224.28	3.14	37.03	404.47	1357.41	542.96	305.31

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
2	22.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	32.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	34.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	35.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-41	-
Chainage	4+617	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	254.59	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	14.69	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-41	1.20	20.50	18.00	16.50	475.27	179.83	17.20	4.30
BH-41	1.20	22.00	19.50	18.00	505.53	203.38	17.58	4.40
BH-41	1.20	23.50	21.00	19.50	535.79	226.94	17.58	4.40
BH-41	1.20	25.00	22.50	21.00	566.05	250.50	17.58	4.40
BH-41	1.20	26.50	24.00	22.50	596.32	274.06	17.96	4.49
BH-41	1.20	28.00	25.50	24.00	626.58	297.61	17.96	4.49
BH-41	1.20	29.50	27.00	25.50	656.84	321.17	17.96	4.49
BH-41	1.20	31.00	28.50	27.00	687.10	344.73	17.96	4.49
BH-41	1.20	32.50	30.00	28.50	717.36	368.29	17.96	4.49
BH-41	1.20	34.00	31.50	30.00	747.62	391.85	17.96	4.49
BH-41	1.20	35.00	32.50	31.00	767.79	407.55	17.96	4.49

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	5.65	9.53	75.00	84.52	33.81	11.38
3	5.50	7.00	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	65.20	79.10	5.65	16.14	110.30	135.97	54.39	18.27
4	7.00	8.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	92.99	106.89	5.65	23.03	144.62	193.32	77.33	27.09
5	8.50	10.00	1.50	Granular	18.53	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	120.79	134.69	5.65	32.30	254.43	335.43	134.17	38.51
6	10.00	11.50	1.50	Granular	19.91	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	149.62	164.55	5.65	40.01	308.28	429.30	171.72	52.09
7	11.50	13.00	1.50	Granular	19.91	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	179.48	194.42	5.65	51.56	468.03	640.60	256.24	68.90
8	13.00	14.50	1.50	Granular	19.91	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	209.35	224.28	5.65	60.13	536.26	768.97	307.59	88.12
9	14.50	16.00	1.50	Granular	10.10	0.03	30	-	19.50	22.44	1.00	-	15.25	16.00	231.86	239.44	5.65	68.90	623.27	924.87	369.95	109.78
10	16.00	17.50	1.50	Granular	10.10	0.03	30	-	19.50	22.44	1.00	-	16.75	17.50	247.01	254.59	5.65	73.40	661.87	1036.87	414.75	132.71
11	17.50	19.00	1.50	Granular	10.10	0.07	30	-	19.50	22.44	1.00	-	18.25	19.00	254.59	254.59	5.65	75.65	661.87	1112.53	445.01	156.27
12	19.00	20.50	1.50	Granular	10.10	0.07	30	-	19.50	22.44	1.00	-	19.75	20.50	254.59	254.59	5.65	75.65	661.87	1188.18	475.27	179.83
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	254.59	254.59	5.65	75.65	661.87	1263.83	505.53	203.38
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	254.59	254.59	5.65	75.65	661.87	1339.48	535.79	226.94
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	254.59	254.59	5.65	75.65	661.87	1415.14	566.05	250.50
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	254.59	254.59	5.65	75.65	661.87	1490.79	596.32	274.06
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	254.59	254.59	5.65	75.65	661.87	1566.44	626.58	297.61
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	254.59	254.59	5.65	75.65	661.87	1642.09	656.84	321.17
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	254.59	254.59	5.65	75.65	661.87	1717.75	687.10	344.73
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	254.59	254.59	5.65	75.65	661.87	1793.40	717.36	368.29
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	254.59	254.59	5.65	75.65	661.87	1869.05	747.62	391.85
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	254.59	254.59	3.77	50.43	661.87	1919.49	767.79	407.55

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
2	22.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	32.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	34.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	35.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-42	-
Chainage	4+751	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	204.70	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	13.70	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-42	1.00	20.50	18.00	16.50	306.10	133.26	13.52	3.38
BH-42	1.00	22.00	19.50	18.00	326.37	149.10	13.52	3.38
BH-42	1.00	23.50	21.00	19.50	346.65	164.94	13.81	3.45
BH-42	1.00	25.00	22.50	21.00	366.92	180.78	13.81	3.45
BH-42	1.00	26.50	24.00	22.50	387.20	196.63	13.81	3.45
BH-42	1.00	28.00	25.50	24.00	407.47	212.47	14.09	3.52
BH-42	1.00	29.50	27.00	25.50	427.75	228.31	14.09	3.52
BH-42	1.00	31.00	28.50	27.00	448.02	244.15	14.09	3.52
BH-42	1.00	32.50	30.00	28.50	468.30	259.99	14.09	3.52
BH-42	1.00	34.00	31.50	30.00	488.57	275.84	14.09	3.52
BH-42	1.00	35.00	32.50	31.00	502.09	286.40	14.09	3.52

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	13.50	27.00	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	18.05	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	40.54	54.08	4.71	8.37	53.49	61.85	24.74	8.39
3	5.50	7.00	1.50	Granular	18.05	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	67.61	81.15	4.71	14.51	92.85	115.72	46.29	14.10
4	7.00	8.50	1.50	Granular	18.05	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	94.69	108.23	4.71	20.32	121.00	164.20	65.68	21.44
5	8.50	10.00	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	122.12	136.02	4.71	28.22	202.48	273.90	109.56	30.99
6	10.00	11.50	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	149.92	163.82	4.71	34.65	241.51	347.58	139.03	42.34
7	11.50	13.00	1.50	Granular	18.53	0.02	29	-	17.60	20.13	1.00	-	12.25	13.00	177.71	191.61	4.71	42.54	316.85	465.46	186.18	55.91
8	13.00	14.50	1.50	Granular	8.72	0.02	29	-	17.60	20.13	1.00	-	13.75	14.50	198.15	204.70	4.71	47.43	330.81	526.85	210.74	70.84
9	14.50	16.00	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	204.70	204.70	4.71	49.00	331.77	576.81	230.72	86.20
10	16.00	17.50	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	204.70	204.70	4.71	49.00	331.77	625.81	250.32	101.57
11	17.50	19.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	204.70	204.70	4.71	50.69	369.82	714.55	285.82	117.42
12	19.00	20.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	204.70	204.70	4.71	50.69	369.82	765.24	306.10	133.26
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	204.70	204.70	4.71	50.69	369.82	815.93	326.37	149.10
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	204.70	204.70	4.71	50.69	369.82	866.62	346.65	164.94
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	204.70	204.70	4.71	50.69	369.82	917.31	366.92	180.78
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	204.70	204.70	4.71	50.69	369.82	967.99	387.20	196.63
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	204.70	204.70	4.71	50.69	369.82	1018.68	407.47	212.47
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	204.70	204.70	4.71	50.69	369.82	1069.37	427.75	228.31
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	204.70	204.70	4.71	50.69	369.82	1120.06	448.02	244.15
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	204.70	204.70	4.71	50.69	369.82	1170.75	468.30	259.99
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	204.70	204.70	4.71	50.69	369.82	1221.44	488.57	275.84
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	204.70	204.70	3.14	33.79	369.82	1255.23	502.09	286.40

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
2	22.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
3	23.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
4	25.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
6	28.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	29.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	31.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	32.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	34.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	35.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-42	-
Chainage	4+751	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.01	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	13.70	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-42	1.20	20.50	18.00	16.50	445.28	172.80	17.58	4.40
BH-42	1.20	22.00	19.50	18.00	473.22	194.73	17.58	4.40
BH-42	1.20	23.50	21.00	19.50	501.15	216.66	17.96	4.49
BH-42	1.20	25.00	22.50	21.00	529.08	238.59	17.96	4.49
BH-42	1.20	26.50	24.00	22.50	557.01	260.51	17.96	4.49
BH-42	1.20	28.00	25.50	24.00	584.95	282.44	18.33	4.58
BH-42	1.20	29.50	27.00	25.50	612.88	304.37	18.33	4.58
BH-42	1.20	31.00	28.50	27.00	640.81	326.30	18.33	4.58
BH-42	1.20	32.50	30.00	28.50	668.75	348.23	18.33	4.58
BH-42	1.20	34.00	31.50	30.00	696.68	370.15	18.33	4.58
BH-42	1.20	35.00	32.50	31.00	715.30	384.77	18.33	4.58

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	13.50	27.00	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	18.05	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	40.54	54.08	5.65	10.04	79.07	89.11	35.64	11.52
3	5.50	7.00	1.50	Granular	18.05	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	67.61	81.15	5.65	17.41	136.14	163.59	65.44	18.77
4	7.00	8.50	1.50	Granular	18.05	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	94.69	108.23	5.65	24.39	176.68	228.51	91.41	27.97
5	8.50	10.00	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	122.12	136.02	5.65	33.87	294.87	380.58	152.23	39.83
6	10.00	11.50	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	149.92	163.82	5.65	41.58	351.08	478.36	191.35	53.85
7	11.50	13.00	1.50	Granular	18.53	0.02	29	-	17.60	20.13	1.00	-	12.25	13.00	177.71	191.61	5.65	51.05	459.97	638.30	255.32	70.52
8	13.00	14.50	1.50	Granular	8.72	0.02	29	-	17.60	20.13	1.00	-	13.75	14.50	198.15	204.70	5.65	56.92	478.11	713.36	285.34	88.83
9	14.50	16.00	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	212.27	219.85	5.65	60.98	514.38	810.61	324.24	108.28
10	16.00	17.50	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	227.43	235.01	5.65	65.33	549.01	910.56	364.22	128.94
11	17.50	19.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	235.01	235.01	5.65	69.83	611.98	1043.37	417.35	150.87
12	19.00	20.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	235.01	235.01	5.65	69.83	611.98	1113.20	445.28	172.80
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	235.01	235.01	5.65	69.83	611.98	1183.04	473.22	194.73
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	235.01	235.01	5.65	69.83	611.98	1252.87	501.15	216.66
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	235.01	235.01	5.65	69.83	611.98	1322.70	529.08	238.59
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	235.01	235.01	5.65	69.83	611.98	1392.54	557.01	260.51
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	235.01	235.01	5.65	69.83	611.98	1462.37	584.95	282.44
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	235.01	235.01	5.65	69.83	611.98	1532.20	612.88	304.37
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	235.01	235.01	5.65	69.83	611.98	1602.03	640.81	326.30
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	235.01	235.01	5.65	69.83	611.98	1671.87	668.75	348.23
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	235.01	235.01	5.65	69.83	611.98	1741.70	696.68	370.15
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	235.01	235.01	3.77	46.56	611.98	1788.25	715.30	384.77

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
2	22.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
3	23.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
4	25.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
6	28.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	29.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	31.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	32.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	34.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	35.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-43	-
Chainage	4+833	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	212.98	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-43	1.00	20.50	18.00	18.00	260.05	130.16	11.85	2.96
BH-43	1.00	22.00	19.50	19.50	312.09	146.08	12.12	3.03
BH-43	1.00	23.50	21.00	21.00	332.49	162.01	12.39	3.10
BH-43	1.00	25.00	22.50	22.50	352.88	177.93	12.65	3.16
BH-43	1.00	26.50	24.00	24.00	373.27	193.86	12.65	3.16
BH-43	1.00	28.00	25.50	25.50	410.19	210.27	12.91	3.23
BH-43	1.00	29.50	27.00	27.00	431.29	226.69	12.91	3.23
BH-43	1.00	31.00	28.50	28.50	452.38	243.10	12.91	3.23
BH-43	1.00	32.50	30.00	30.00	473.48	259.52	12.91	3.23
BH-43	1.00	34.00	31.50	31.50	494.58	275.94	12.91	3.23
BH-43	1.00	35.00	32.50	32.50	508.64	286.88	12.91	3.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.50	27.00	4.71	2.45	18.98	21.43	8.57	5.08
2	4.00	5.50	1.50	Granular	18.05	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	40.54	54.08	4.71	7.36	35.18	44.99	18.00	8.80
3	5.50	7.00	1.50	Granular	18.05	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	67.61	81.15	4.71	13.39	68.26	91.47	36.59	14.19
4	7.00	8.50	1.50	Granular	18.05	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	94.69	108.23	4.71	18.76	89.14	131.10	52.44	21.10
5	8.50	10.00	1.50	Granular	19.91	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	123.16	138.09	4.71	26.43	152.93	221.32	88.53	30.15
6	10.00	11.50	1.50	Granular	19.91	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	153.02	167.96	4.71	32.84	183.98	285.22	114.09	40.99
7	11.50	13.00	1.50	Granular	19.91	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	182.89	197.82	4.71	42.27	290.12	433.62	173.45	54.48
8	13.00	14.50	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	205.40	212.98	4.71	47.47	305.33	496.31	198.52	69.42
9	14.50	16.00	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	212.98	212.98	4.71	49.22	305.33	545.53	218.21	84.85
10	16.00	17.50	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	212.98	212.98	4.71	49.22	305.33	594.76	237.90	100.28
11	17.50	19.00	1.50	Granular	10.10	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	212.98	212.98	4.71	47.46	265.76	602.65	241.06	115.22
12	19.00	20.50	1.50	Granular	10.10	0.08	27	-	13.80	15.50	1.00	-	19.75	20.50	212.98	212.98	4.71	47.46	265.76	650.12	260.05	130.16
13	20.50	22.00	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	212.98	212.98	4.71	50.98	344.90	780.23	312.09	146.08
14	22.00	23.50	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	212.98	212.98	4.71	50.98	344.90	831.21	332.49	162.01
15	23.50	25.00	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	212.98	212.98	4.71	50.98	344.90	882.20	352.88	177.93
16	25.00	26.50	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	25.75	26.50	212.98	212.98	4.71	50.98	344.90	933.18	373.27	193.86
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	212.98	212.98	4.71	52.74	384.47	1025.48	410.19	210.27
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	212.98	212.98	4.71	52.74	384.47	1078.22	431.29	226.69
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	212.98	212.98	4.71	52.74	384.47	1130.96	452.38	243.10
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	212.98	212.98	4.71	52.74	384.47	1183.70	473.48	259.52
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	212.98	212.98	4.71	52.74	384.47	1236.44	494.58	275.94
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	212.98	212.98	3.14	35.16	384.47	1271.60	508.64	286.88

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
6	28.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	29.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	31.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	32.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	34.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	35.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-43	-
Chainage	4+833	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	243.29	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-43	1.20	20.50	18.00	18.00	369.38	168.49	15.51	3.88
BH-43	1.20	22.00	19.50	19.50	449.46	190.44	15.86	3.96
BH-43	1.20	23.50	21.00	21.00	477.41	212.38	16.20	4.05
BH-43	1.20	25.00	22.50	22.50	505.37	234.32	16.54	4.14
BH-43	1.20	26.50	24.00	24.00	533.32	256.26	16.54	4.14
BH-43	1.20	28.00	25.50	25.50	588.30	278.88	16.88	4.22
BH-43	1.20	29.50	27.00	27.00	617.21	301.50	16.88	4.22
BH-43	1.20	31.00	28.50	28.50	646.13	324.12	16.88	4.22
BH-43	1.20	32.50	30.00	30.00	675.05	346.73	16.88	4.22
BH-43	1.20	34.00	31.50	31.50	703.97	369.35	16.88	4.22
BH-43	1.20	35.00	32.50	32.50	723.24	384.43	16.88	4.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.50	27.00	5.65	2.94	28.15	31.09	12.44	7.16
2	4.00	5.50	1.50	Granular	18.05	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	40.54	54.08	5.65	8.83	51.48	63.25	25.30	12.01
3	5.50	7.00	1.50	Granular	18.05	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	67.61	81.15	5.65	16.07	99.93	127.78	51.11	18.88
4	7.00	8.50	1.50	Granular	18.05	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	94.69	108.23	5.65	22.51	130.00	180.35	72.14	27.56
5	8.50	10.00	1.50	Granular	19.91	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	123.16	138.09	5.65	31.72	222.90	304.98	121.99	38.81
6	10.00	11.50	1.50	Granular	19.91	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	153.02	167.96	5.65	39.41	267.62	389.11	155.64	52.22
7	11.50	13.00	1.50	Granular	19.91	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	182.89	197.82	5.65	50.72	421.32	593.53	237.41	68.80
8	13.00	14.50	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	205.40	212.98	5.65	56.97	441.48	670.65	268.26	87.13
9	14.50	16.00	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	220.55	228.13	5.65	61.17	472.13	762.47	304.99	106.63
10	16.00	17.50	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	235.71	243.29	5.65	65.37	502.77	858.49	343.39	127.31
11	17.50	19.00	1.50	Granular	10.10	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	243.29	243.29	5.65	65.06	437.62	858.40	343.36	147.90
12	19.00	20.50	1.50	Granular	10.10	0.08	27	-	13.80	15.50	1.00	-	19.75	20.50	243.29	243.29	5.65	65.06	437.62	923.46	369.38	168.49
13	20.50	22.00	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	243.29	243.29	5.65	69.88	567.92	1123.65	449.46	190.44
14	22.00	23.50	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	243.29	243.29	5.65	69.88	567.92	1193.53	477.41	212.38
15	23.50	25.00	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	243.29	243.29	5.65	69.88	567.92	1263.41	505.37	234.32
16	25.00	26.50	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	25.75	26.50	243.29	243.29	5.65	69.88	567.92	1333.30	533.32	256.26
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	243.29	243.29	5.65	72.29	633.07	1470.74	588.30	278.88
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	243.29	243.29	5.65	72.29	633.07	1543.03	617.21	301.50
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	243.29	243.29	5.65	72.29	633.07	1615.33	646.13	324.12
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	243.29	243.29	5.65	72.29	633.07	1687.62	675.05	346.73
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	243.29	243.29	5.65	72.29	633.07	1759.91	703.97	369.35
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	243.29	243.29	3.77	48.20	633.07	1808.11	723.24	384.43

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
6	28.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	29.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	31.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	32.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	34.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	35.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-44	-
Chainage	4+910	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	213.07	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	13.85	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-44	1.00	20.50	18.00	18.00	301.34	136.87	11.58	2.89
BH-44	1.00	22.00	19.50	19.50	338.28	153.29	11.85	2.96
BH-44	1.00	23.50	21.00	21.00	359.39	169.71	12.12	3.03
BH-44	1.00	25.00	22.50	22.50	380.49	186.14	12.39	3.10
BH-44	1.00	26.50	24.00	24.00	401.60	202.56	12.39	3.10
BH-44	1.00	28.00	25.50	25.50	422.70	218.98	12.65	3.16
BH-44	1.00	29.50	27.00	27.00	443.80	235.40	12.65	3.16
BH-44	1.00	31.00	28.50	28.50	464.91	251.83	12.65	3.16
BH-44	1.00	32.50	30.00	30.00	486.01	268.25	12.65	3.16
BH-44	1.00	34.00	31.50	31.50	507.12	284.67	12.65	3.16
BH-44	1.00	35.00	32.50	32.50	521.19	295.62	12.65	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.06	26	-	11.90	13.19	1.00	-	3.25	4.00	13.50	27.00	4.71	2.90	36.52	39.41	15.77	5.21
2	4.00	5.50	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	4.75	5.50	40.90	54.80	4.71	8.78	65.67	77.34	30.94	9.32
3	5.50	7.00	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	68.69	82.59	4.71	14.74	94.57	120.99	48.39	15.09
4	7.00	8.50	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	7.75	8.50	96.49	110.39	4.71	22.30	166.48	215.20	86.08	22.99
5	8.50	10.00	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	124.28	138.18	4.71	28.72	205.51	282.95	113.18	32.68
6	10.00	11.50	1.50	Granular	19.91	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	153.11	168.05	4.71	35.39	248.31	361.13	144.45	44.24
7	11.50	13.00	1.50	Granular	19.91	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	182.98	197.91	4.71	42.29	290.25	445.36	178.15	57.73
8	13.00	14.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	205.49	213.07	4.71	49.19	345.04	549.35	219.74	73.15
9	14.50	16.00	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	213.07	213.07	4.71	51.00	345.04	600.35	240.14	89.08
10	16.00	17.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	213.07	213.07	4.71	51.00	345.04	651.36	260.54	105.01
11	17.50	19.00	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	213.07	213.07	4.71	51.00	345.04	702.36	280.94	120.94
12	19.00	20.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	213.07	213.07	4.71	51.00	345.04	753.36	301.34	136.87
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	213.07	213.07	4.71	52.76	384.63	845.71	338.28	153.29
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	213.07	213.07	4.71	52.76	384.63	898.47	359.39	169.71
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	213.07	213.07	4.71	52.76	384.63	951.23	380.49	186.14
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	213.07	213.07	4.71	52.76	384.63	1003.99	401.60	202.56
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	213.07	213.07	4.71	52.76	384.63	1056.75	422.70	218.98
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	213.07	213.07	4.71	52.76	384.63	1109.51	443.80	235.40
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	213.07	213.07	4.71	52.76	384.63	1162.27	464.91	251.83
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	213.07	213.07	4.71	52.76	384.63	1215.03	486.01	268.25
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	213.07	213.07	4.71	52.76	384.63	1267.79	507.12	284.67
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	213.07	213.07	3.14	35.17	384.63	1302.97	521.19	295.62

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
2	22.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
3	23.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	32.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	34.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	35.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-44	-
Chainage	4+910	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	243.38	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	13.85	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-44	1.20	20.50	18.00	18.00	433.69	176.97	15.15	3.79
BH-44	1.20	22.00	19.50	19.50	488.69	199.59	15.51	3.88
BH-44	1.20	23.50	21.00	21.00	517.62	222.22	15.86	3.96
BH-44	1.20	25.00	22.50	22.50	546.54	244.84	16.20	4.05
BH-44	1.20	26.50	24.00	24.00	575.47	267.46	16.20	4.05
BH-44	1.20	28.00	25.50	25.50	604.40	290.09	16.54	4.14
BH-44	1.20	29.50	27.00	27.00	633.33	312.71	16.54	4.14
BH-44	1.20	31.00	28.50	28.50	662.26	335.34	16.54	4.14
BH-44	1.20	32.50	30.00	30.00	691.18	357.96	16.54	4.14
BH-44	1.20	34.00	31.50	31.50	720.11	380.59	16.54	4.14
BH-44	1.20	35.00	32.50	32.50	739.40	395.67	16.54	4.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.00	0.06	26	-	11.90	13.19	1.00	-	3.25	4.00	13.50	27.00	5.65	3.48	55.02	58.49	23.40	7.31
2	4.00	5.50	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	4.75	5.50	40.90	54.80	5.65	10.53	97.06	111.07	44.43	12.63
3	5.50	7.00	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	68.69	82.59	5.65	17.69	138.68	170.38	68.15	19.96
4	7.00	8.50	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	7.75	8.50	96.49	110.39	5.65	26.76	243.03	301.49	120.60	29.83
5	8.50	10.00	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	124.28	138.18	5.65	34.47	299.24	392.17	156.87	41.85
6	10.00	11.50	1.50	Granular	19.91	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	153.11	168.05	5.65	42.46	361.11	496.50	198.60	56.12
7	11.50	13.00	1.50	Granular	19.91	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	182.98	197.91	5.65	50.75	421.50	607.64	243.06	72.70
8	13.00	14.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	205.49	213.07	5.65	59.03	498.88	744.05	297.62	91.61
9	14.50	16.00	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	220.64	228.22	5.65	63.38	533.51	842.05	336.82	111.73
10	16.00	17.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	235.80	243.38	5.65	67.73	568.13	944.41	377.76	133.07
11	17.50	19.00	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	243.38	243.38	5.65	69.91	568.13	1014.32	405.73	155.02
12	19.00	20.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	243.38	243.38	5.65	69.91	568.13	1084.23	433.69	176.97
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	243.38	243.38	5.65	72.32	633.30	1221.72	488.69	199.59
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	243.38	243.38	5.65	72.32	633.30	1294.04	517.62	222.22
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	243.38	243.38	5.65	72.32	633.30	1366.36	546.54	244.84
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	243.38	243.38	5.65	72.32	633.30	1438.68	575.47	267.46
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	243.38	243.38	5.65	72.32	633.30	1511.00	604.40	290.09
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	243.38	243.38	5.65	72.32	633.30	1583.32	633.33	312.71
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	243.38	243.38	5.65	72.32	633.30	1655.64	662.26	335.34
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	243.38	243.38	5.65	72.32	633.30	1727.96	691.18	357.96
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	243.38	243.38	5.65	72.32	633.30	1800.28	720.11	380.59
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	243.38	243.38	3.77	48.21	633.30	1848.49	739.40	395.67

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
2	22.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
3	23.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	32.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	34.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	35.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-45	-
Chainage	5+030	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	205.43	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-45	1.00	20.50	18.00	18.00	289.30	131.83	11.30	2.83
BH-45	1.00	22.00	19.50	19.50	324.92	147.72	11.58	2.89
BH-45	1.00	23.50	21.00	21.00	345.27	163.61	11.58	2.89
BH-45	1.00	25.00	22.50	22.50	365.55	179.51	11.58	2.89
BH-45	1.00	26.50	24.00	24.00	385.90	195.40	11.58	2.89
BH-45	1.00	28.00	25.50	25.50	406.25	211.29	11.85	2.96
BH-45	1.00	29.50	27.00	27.00	426.66	227.19	11.85	2.96
BH-45	1.00	31.00	28.50	28.50	447.01	243.08	11.85	2.96
BH-45	1.00	32.50	30.00	30.00	467.36	258.97	12.12	3.03
BH-45	1.00	34.00	31.50	31.50	487.71	274.86	12.12	3.03
BH-45	1.00	35.00	32.50	32.50	501.27	285.46	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	4.71	2.65	28.74	31.38	12.55	5.14
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	4.71	7.94	50.73	61.32	24.53	9.01
3	5.50	7.00	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	65.20	79.10	4.71	13.45	75.13	99.17	39.67	14.43
4	7.00	8.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	92.99	106.89	4.71	19.19	98.97	142.20	56.88	21.45
5	8.50	10.00	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	120.79	134.69	4.71	27.92	200.60	271.75	108.70	30.92
6	10.00	11.50	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	148.58	162.48	4.71	34.34	239.64	345.12	138.05	42.18
7	11.50	13.00	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	176.38	190.28	4.71	40.76	278.67	424.92	169.97	55.24
8	13.00	14.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	197.85	205.43	4.71	47.36	332.93	526.54	210.62	70.15
9	14.50	16.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	205.43	205.43	4.71	49.17	332.93	575.72	230.29	85.57
10	16.00	17.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	205.43	205.43	4.71	49.17	332.93	624.89	249.96	100.99
11	17.50	19.00	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	205.43	205.43	4.71	49.17	332.93	674.07	269.63	116.41
12	19.00	20.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	205.43	205.43	4.71	49.17	332.93	723.24	289.30	131.83
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	205.43	205.43	4.71	50.87	371.12	812.31	324.92	147.72
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	205.43	205.43	4.71	50.87	371.12	863.18	345.27	163.61
15	23.50	25.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	205.43	205.43	4.71	50.87	370.96	913.88	365.55	179.51
16	25.00	26.50	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	205.43	205.43	4.71	50.87	370.96	964.75	385.90	195.40
17	26.50	28.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	205.43	205.43	4.71	50.87	370.96	1015.62	406.25	211.29
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	205.43	205.43	4.71	50.87	371.12	1066.66	426.66	227.19
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	205.43	205.43	4.71	50.87	371.12	1117.53	447.01	243.08
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	205.43	205.43	4.71	50.87	371.12	1168.40	467.36	258.97
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	205.43	205.43	4.71	50.87	371.12	1219.27	487.71	274.86
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	205.43	205.43	3.14	33.91	371.12	1253.18	501.27	285.46

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
2	22.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
3	23.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-45	-
Chainage	5+030	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.74	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-45	1.20	20.50	18.00	18.00	418.07	170.92	14.79	3.70
BH-45	1.20	22.00	19.50	19.50	471.36	192.91	15.15	3.79
BH-45	1.20	23.50	21.00	21.00	499.38	214.90	15.15	3.79
BH-45	1.20	25.00	22.50	22.50	527.29	236.88	15.15	3.79
BH-45	1.20	26.50	24.00	24.00	555.31	258.87	15.15	3.79
BH-45	1.20	28.00	25.50	25.50	583.33	280.86	15.51	3.88
BH-45	1.20	29.50	27.00	27.00	611.46	302.85	15.51	3.88
BH-45	1.20	31.00	28.50	28.50	639.48	324.84	15.51	3.88
BH-45	1.20	32.50	30.00	30.00	667.50	346.83	15.86	3.96
BH-45	1.20	34.00	31.50	31.50	695.52	368.82	15.86	3.96
BH-45	1.20	35.00	32.50	32.50	714.20	383.48	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	5.65	3.18	43.32	46.50	18.60	7.22
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	5.65	9.53	75.00	87.70	35.08	12.27
3	5.50	7.00	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	65.20	79.10	5.65	16.14	110.30	139.14	55.66	19.16
4	7.00	8.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	92.99	106.89	5.65	23.03	144.62	196.50	78.60	27.98
5	8.50	10.00	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	120.79	134.69	5.65	33.50	292.17	377.55	151.02	39.74
6	10.00	11.50	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	148.58	162.48	5.65	41.21	348.38	474.96	189.99	53.65
7	11.50	13.00	1.50	Granular	18.53	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	176.38	190.28	5.65	48.92	404.59	580.09	232.03	69.72
8	13.00	14.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	197.85	205.43	5.65	56.83	481.44	713.77	285.51	88.01
9	14.50	16.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	213.01	220.59	5.65	61.19	516.06	809.58	323.83	107.52
10	16.00	17.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	228.16	235.74	5.65	65.54	550.69	909.75	363.90	128.25
11	17.50	19.00	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	235.74	235.74	5.65	67.72	550.69	977.46	390.98	149.58
12	19.00	20.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	235.74	235.74	5.65	67.72	550.69	1045.18	418.07	170.92
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	235.74	235.74	5.65	70.05	613.86	1178.40	471.36	192.91
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	235.74	235.74	5.65	70.05	613.86	1248.45	499.38	214.90
15	23.50	25.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	235.74	235.74	5.65	70.05	613.58	1318.22	527.29	236.88
16	25.00	26.50	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	235.74	235.74	5.65	70.05	613.58	1388.27	555.31	258.87
17	26.50	28.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	235.74	235.74	5.65	70.05	613.58	1458.33	583.33	280.86
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	235.74	235.74	5.65	70.05	613.86	1528.66	611.46	302.85
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	235.74	235.74	5.65	70.05	613.86	1598.71	639.48	324.84
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	235.74	235.74	5.65	70.05	613.86	1668.76	667.50	346.83
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	235.74	235.74	5.65	70.05	613.86	1738.81	695.52	368.82
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	235.74	235.74	3.77	46.70	613.86	1785.51	714.20	383.48

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
2	22.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
3	23.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-45A	-
Chainage	5+080	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	196.93	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-45A	1.00	22.00	19.50	16.50	273.22	136.30	10.36	2.59
BH-45A	1.00	23.50	21.00	18.00	291.43	150.69	10.36	2.59
BH-45A	1.00	25.00	22.50	19.50	309.63	165.09	10.73	2.68
BH-45A	1.00	26.50	24.00	21.00	358.51	180.39	11.10	2.77
BH-45A	1.00	28.00	25.50	22.50	378.01	195.69	11.45	2.86
BH-45A	1.00	29.50	27.00	24.00	397.52	211.00	11.45	2.86
BH-45A	1.00	30.00	27.50	24.50	404.02	216.10	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.10	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	38.48	51.30	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.10	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	64.13	76.95	4.71	11.64	48.71	60.35	24.14	10.96
4	7.00	8.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	89.78	102.60	4.71	18.53	94.73	124.90	49.96	17.79
5	8.50	10.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	115.43	128.25	4.71	23.82	116.73	170.71	68.29	26.11
6	10.00	11.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	142.15	156.05	4.71	29.33	141.13	224.45	89.78	35.98
7	11.50	13.00	1.50	Granular	18.53	0.07	29	-	17.60	20.13	1.00	-	12.25	13.00	169.94	183.84	4.71	40.68	304.52	428.52	171.41	49.01
8	13.00	14.50	1.50	Granular	8.72	0.07	29	-	17.60	20.13	1.00	-	13.75	14.50	190.38	196.93	4.71	45.57	318.48	488.06	195.22	63.42
9	14.50	16.00	1.50	Granular	8.72	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	196.93	196.93	4.71	47.14	318.48	535.19	214.08	78.27
10	16.00	17.50	1.50	Granular	8.72	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	196.93	196.93	4.71	47.14	318.48	582.33	232.93	93.12
11	17.50	19.00	1.50	Granular	8.72	0.02	28	-	15.70	17.82	1.00	-	18.25	19.00	196.93	196.93	4.71	45.51	281.94	591.31	236.52	107.51
12	19.00	20.50	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	19.75	20.50	196.93	196.93	4.71	45.51	282.66	637.54	255.02	121.91
13	20.50	22.00	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	21.25	22.00	196.93	196.93	4.71	45.51	282.66	683.06	273.22	136.30
14	22.00	23.50	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	22.75	23.50	196.93	196.93	4.71	45.51	282.66	728.57	291.43	150.69
15	23.50	25.00	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	24.25	25.00	196.93	196.93	4.71	45.51	282.66	774.08	309.63	165.09
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	196.93	196.93	4.71	48.76	356.08	896.26	358.51	180.39
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	196.93	196.93	4.71	48.76	356.08	945.03	378.01	195.69
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	196.93	196.93	4.71	48.76	356.08	993.79	397.52	211.00
19	29.50	30.00	0.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	196.93	196.93	1.57	16.25	356.08	1010.05	404.02	216.10

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
5	27.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-45A	-
Chainage	5+080	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	223.10	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-45A	1.20	22.00	19.50	16.50	388.59	177.57	13.46	3.36
BH-45A	1.20	23.50	21.00	18.00	413.34	197.27	13.46	3.36
BH-45A	1.20	25.00	22.50	19.50	438.09	216.97	13.94	3.49
BH-45A	1.20	26.50	24.00	21.00	512.58	237.90	14.41	3.60
BH-45A	1.20	28.00	25.50	22.50	539.10	258.84	14.88	3.72
BH-45A	1.20	29.50	27.00	24.00	565.62	279.78	14.88	3.72
BH-45A	1.20	30.00	27.50	24.50	574.46	286.76	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (Ki)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.10	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	38.48	51.30	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.10	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	64.13	76.95	5.65	13.97	70.92	84.89	33.96	15.00
4	7.00	8.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	89.78	102.60	5.65	22.23	138.35	174.55	69.82	23.60
5	8.50	10.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	115.43	128.25	5.65	28.58	170.03	234.81	93.92	33.97
6	10.00	11.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	142.15	156.05	5.65	35.20	205.32	305.31	122.12	46.20
7	11.50	13.00	1.50	Granular	18.53	0.07	29	-	17.60	20.13	1.00	-	12.25	13.00	169.94	183.84	5.65	48.82	442.21	591.02	236.41	62.25
8	13.00	14.50	1.50	Granular	8.72	0.07	29	-	17.60	20.13	1.00	-	13.75	14.50	190.38	196.93	5.65	54.69	460.35	663.84	265.54	79.94
9	14.50	16.00	1.50	Granular	8.72	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	203.47	210.01	5.65	58.45	490.25	752.18	300.87	98.68
10	16.00	17.50	1.50	Granular	8.72	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	216.55	223.10	5.65	62.20	520.14	844.28	337.71	118.47
11	17.50	19.00	1.50	Granular	8.72	0.02	28	-	15.70	17.82	1.00	-	18.25	19.00	223.10	223.10	5.65	61.87	460.47	846.48	338.59	138.17
12	19.00	20.50	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	19.75	20.50	223.10	223.10	5.65	61.87	461.72	909.61	363.84	157.87
13	20.50	22.00	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	21.25	22.00	223.10	223.10	5.65	61.87	461.72	971.48	388.59	177.57
14	22.00	23.50	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	22.75	23.50	223.10	223.10	5.65	61.87	461.72	1033.36	413.34	197.27
15	23.50	25.00	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	24.25	25.00	223.10	223.10	5.65	61.87	461.72	1095.23	438.09	216.97
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	223.10	223.10	5.65	66.29	581.65	1281.45	512.58	237.90
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	223.10	223.10	5.65	66.29	581.65	1347.75	539.10	258.84
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	223.10	223.10	5.65	66.29	581.65	1414.04	565.62	279.78
19	29.50	30.00	0.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	223.10	223.10	1.88	22.10	581.65	1436.14	574.46	286.76

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
5	27.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-46	-
Chainage	5+122	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	182.22	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	12.90	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-46	1.00	20.50	18.00	16.50	272.28	120.72	10.40	2.60
BH-46	1.00	22.00	19.50	18.00	290.33	135.00	10.73	2.68
BH-46	1.00	23.50	21.00	19.50	308.38	149.28	11.06	2.77
BH-46	1.00	25.00	22.50	21.00	326.42	163.57	11.38	2.85
BH-46	1.00	26.50	24.00	22.50	344.47	177.85	11.70	2.93
BH-46	1.00	28.00	25.50	24.00	362.52	192.14	11.70	2.93
BH-46	1.00	29.50	27.00	25.50	380.57	206.42	12.01	3.00
BH-46	1.00	31.00	28.50	27.00	398.62	220.70	12.01	3.00
BH-46	1.00	32.50	30.00	28.50	416.67	234.99	12.32	3.08
BH-46	1.00	34.00	31.50	30.00	434.72	249.27	12.32	3.08
BH-46	1.00	35.00	32.50	31.00	446.75	258.79	12.32	3.08

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	4.71	7.94	50.73	58.67	23.47	8.27
3	5.50	7.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	64.13	76.95	4.71	13.23	72.73	93.90	37.56	13.63
4	7.00	8.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	89.78	102.60	4.71	18.53	94.73	134.43	53.77	20.46
5	8.50	10.00	1.50	Granular	17.10	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	115.43	128.25	4.71	24.77	141.38	205.85	82.34	29.05
6	10.00	11.50	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	142.15	156.05	4.71	30.51	170.95	265.93	106.37	39.24
7	11.50	13.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	162.59	169.13	4.71	37.58	242.91	375.46	150.18	51.41
8	13.00	14.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	175.67	182.22	4.71	40.60	261.28	434.44	173.77	64.43
9	14.50	16.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	182.22	182.22	4.71	43.62	296.10	512.87	205.15	78.29
10	16.00	17.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	182.22	182.22	4.71	43.62	296.10	556.49	222.60	92.15
11	17.50	19.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	182.22	182.22	4.71	45.12	330.06	635.57	254.23	106.43
12	19.00	20.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	182.22	182.22	4.71	45.12	330.06	680.70	272.28	120.72
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	182.22	182.22	4.71	45.12	330.06	725.82	290.33	135.00
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	182.22	182.22	4.71	45.12	330.06	770.94	308.38	149.28
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	182.22	182.22	4.71	45.12	330.06	816.06	326.42	163.57
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	182.22	182.22	4.71	45.12	330.06	861.18	344.47	177.85
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	182.22	182.22	4.71	45.12	330.06	906.30	362.52	192.14
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	182.22	182.22	4.71	45.12	330.06	951.43	380.57	206.42
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	182.22	182.22	4.71	45.12	330.06	996.55	398.62	220.70
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	182.22	182.22	4.71	45.12	330.06	1041.67	416.67	234.99
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	182.22	182.22	4.71	45.12	330.06	1086.79	434.72	249.27
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	182.22	182.22	3.14	30.08	330.06	1116.87	446.75	258.79

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
2	22.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
3	23.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
4	25.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
5	26.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
6	28.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
7	29.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	31.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	32.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	34.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	35.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-46	-
Chainage	5+122	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	212.53	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	12.90	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-46	1.20	20.50	18.00	16.50	400.88	157.75	13.53	3.38
BH-46	1.20	22.00	19.50	18.00	426.14	177.81	13.97	3.49
BH-46	1.20	23.50	21.00	19.50	451.40	197.87	14.39	3.60
BH-46	1.20	25.00	22.50	21.00	476.67	217.93	14.81	3.70
BH-46	1.20	26.50	24.00	22.50	501.93	237.98	15.22	3.81
BH-46	1.20	28.00	25.50	24.00	527.19	258.04	15.22	3.81
BH-46	1.20	29.50	27.00	25.50	552.45	278.10	15.63	3.91
BH-46	1.20	31.00	28.50	27.00	577.71	298.16	15.63	3.91
BH-46	1.20	32.50	30.00	28.50	602.97	318.22	16.03	4.01
BH-46	1.20	34.00	31.50	30.00	628.23	338.27	16.03	4.01
BH-46	1.20	35.00	32.50	31.00	645.07	351.65	16.03	4.01

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_s)	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{D_1})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	5.65	9.53	75.00	84.52	33.81	11.38
3	5.50	7.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	64.13	76.95	5.65	15.88	106.67	132.08	52.83	18.20
4	7.00	8.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	89.78	102.60	5.65	22.23	138.35	185.99	74.39	26.80
5	8.50	10.00	1.50	Granular	17.10	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	115.43	128.25	5.65	29.73	205.89	283.26	113.30	37.50
6	10.00	11.50	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	142.15	156.05	5.65	36.61	248.67	362.64	145.06	50.12
7	11.50	13.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	162.59	169.13	5.65	45.09	351.34	510.40	204.16	65.12
8	13.00	14.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	175.67	182.22	5.65	48.72	377.80	585.59	234.23	81.14
9	14.50	16.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	189.79	197.37	5.65	54.52	463.03	725.33	290.13	98.78
10	16.00	17.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	204.95	212.53	5.65	58.87	497.65	818.82	327.53	117.64
11	17.50	19.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	212.53	212.53	5.65	63.15	554.73	939.05	375.62	137.70
12	19.00	20.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	212.53	212.53	5.65	63.15	554.73	1002.21	400.88	157.75
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	212.53	212.53	5.65	63.15	554.73	1065.36	426.14	177.81
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	212.53	212.53	5.65	63.15	554.73	1128.51	451.40	197.87
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	212.53	212.53	5.65	63.15	554.73	1191.66	476.67	217.93
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	212.53	212.53	5.65	63.15	554.73	1254.82	501.93	237.98
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	212.53	212.53	5.65	63.15	554.73	1317.97	527.19	258.04
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	212.53	212.53	5.65	63.15	554.73	1381.12	552.45	278.10
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	212.53	212.53	5.65	63.15	554.73	1444.28	577.71	298.16
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	212.53	212.53	5.65	63.15	554.73	1507.43	602.97	318.22
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	212.53	212.53	5.65	63.15	554.73	1570.58	628.23	338.27
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	212.53	212.53	3.77	42.10	554.73	1612.68	645.07	351.65

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
2	22.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
3	23.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
4	25.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
5	26.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
6	28.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
7	29.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	31.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	32.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	34.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	35.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-48	-
Chainage	5+393	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	204.77	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-48	1.00	20.50	18.00	18.00	284.77	128.95	12.12	3.03
BH-48	1.00	22.00	19.50	19.50	320.28	144.80	12.12	3.03
BH-48	1.00	23.50	21.00	21.00	340.57	160.65	12.39	3.10
BH-48	1.00	25.00	22.50	22.50	360.85	176.50	12.39	3.10
BH-48	1.00	26.50	24.00	24.00	381.13	192.34	12.65	3.16
BH-48	1.00	28.00	25.50	25.50	401.42	208.19	12.65	3.16
BH-48	1.00	29.50	27.00	27.00	421.70	224.04	12.65	3.16
BH-48	1.00	31.00	28.50	28.50	441.98	239.88	12.65	3.16
BH-48	1.00	32.50	30.00	30.00	462.26	255.73	12.91	3.23
BH-48	1.00	34.00	31.50	31.50	482.55	271.58	12.91	3.23
BH-48	1.00	35.00	32.50	32.50	496.07	282.14	12.91	3.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.05	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	13.54	27.08	4.71	2.57	22.80	25.37	10.15	5.12
2	4.00	5.50	1.50	Granular	18.05	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	40.61	54.15	4.71	7.71	41.33	51.61	20.65	8.93
3	5.50	7.00	1.50	Granular	18.05	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	67.69	81.23	4.71	14.53	92.93	117.73	47.09	14.64
4	7.00	8.50	1.50	Granular	18.05	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	94.76	108.30	4.71	20.34	121.08	166.22	66.49	21.99
5	8.50	10.00	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	122.20	136.10	4.71	26.22	150.21	221.57	88.63	30.98
6	10.00	11.50	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	149.99	163.89	4.71	32.19	179.11	282.67	113.07	41.64
7	11.50	13.00	1.50	Granular	18.53	0.07	27	-	13.80	15.50	1.00	-	12.25	13.00	177.79	191.69	4.71	39.62	244.33	387.51	155.00	54.39
8	13.00	14.50	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	13.75	14.50	198.23	204.77	4.71	44.18	254.99	442.35	176.94	68.40
9	14.50	16.00	1.50	Granular	10.10	0.07	27	-	13.80	15.50	1.00	-	15.25	16.00	204.77	204.77	4.71	45.64	255.74	488.73	195.49	82.83
10	16.00	17.50	1.50	Granular	10.10	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	204.77	204.77	4.71	49.02	331.88	613.90	245.56	98.21
11	17.50	19.00	1.50	Granular	10.10	0.10	29	-	17.60	20.13	1.00	-	18.25	19.00	204.77	204.77	4.71	49.02	331.88	662.91	265.17	113.58
12	19.00	20.50	1.50	Granular	10.10	0.10	29	-	17.60	20.13	1.00	-	19.75	20.50	204.77	204.77	4.71	49.02	331.88	711.93	284.77	128.95
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	204.77	204.77	4.71	50.71	369.96	800.71	320.28	144.80
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	204.77	204.77	4.71	50.71	369.96	851.42	340.57	160.65
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	204.77	204.77	4.71	50.71	369.96	902.12	360.85	176.50
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	204.77	204.77	4.71	50.71	369.96	952.83	381.13	192.34
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	204.77	204.77	4.71	50.71	369.96	1003.54	401.42	208.19
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	204.77	204.77	4.71	50.71	369.96	1054.24	421.70	224.04
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	204.77	204.77	4.71	50.71	369.96	1104.95	441.98	239.88
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	204.77	204.77	4.71	50.71	369.96	1155.66	462.26	255.73
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	204.77	204.77	4.71	50.71	369.96	1206.37	482.55	271.58
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	204.77	204.77	3.14	33.80	369.96	1240.17	496.07	282.14

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	32.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	34.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	35.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-48	-
Chainage	5+393	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.08	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Ground Water Table from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-48	1.20	20.50	18.00	18.00	412.48	167.43	15.86	3.96
BH-48	1.20	22.00	19.50	19.50	465.62	189.36	15.86	3.96
BH-48	1.20	23.50	21.00	21.00	493.56	211.29	16.20	4.05
BH-48	1.20	25.00	22.50	22.50	521.51	233.23	16.20	4.05
BH-48	1.20	26.50	24.00	24.00	549.45	255.16	16.54	4.14
BH-48	1.20	28.00	25.50	25.50	577.39	277.10	16.54	4.14
BH-48	1.20	29.50	27.00	27.00	605.33	299.03	16.54	4.14
BH-48	1.20	31.00	28.50	28.50	633.27	320.97	16.54	4.14
BH-48	1.20	32.50	30.00	30.00	661.22	342.90	16.88	4.22
BH-48	1.20	34.00	31.50	31.50	689.16	364.84	16.88	4.22
BH-48	1.20	35.00	32.50	32.50	707.79	379.46	16.88	4.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.05	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	13.54	27.08	5.65	3.08	34.06	37.15	14.86	7.20
2	4.00	5.50	1.50	Granular	18.05	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	40.61	54.15	5.65	9.25	60.75	73.09	29.23	12.16
3	5.50	7.00	1.50	Granular	18.05	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	67.69	81.23	5.65	17.43	136.25	166.02	66.41	19.42
4	7.00	8.50	1.50	Granular	18.05	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	94.76	108.30	5.65	24.40	176.79	230.96	92.39	28.63
5	8.50	10.00	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	122.20	136.10	5.65	31.47	218.80	304.44	121.78	39.81
6	10.00	11.50	1.50	Granular	18.53	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	149.99	163.89	5.65	38.63	260.42	384.69	153.88	53.00
7	11.50	13.00	1.50	Granular	18.53	0.07	27	-	13.80	15.50	1.00	-	12.25	13.00	177.79	191.69	5.65	47.55	354.74	526.55	210.62	68.69
8	13.00	14.50	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	13.75	14.50	198.23	204.77	5.65	53.01	368.55	593.38	237.35	85.91
9	14.50	16.00	1.50	Granular	10.10	0.07	27	-	13.80	15.50	1.00	-	15.25	16.00	212.35	219.93	5.65	56.79	396.51	678.14	271.25	104.19
10	16.00	17.50	1.50	Granular	10.10	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	227.50	235.08	5.65	65.35	549.18	896.15	358.46	124.86
11	17.50	19.00	1.50	Granular	10.10	0.10	29	-	17.60	20.13	1.00	-	18.25	19.00	235.08	235.08	5.65	67.53	549.18	963.68	385.47	146.14
12	19.00	20.50	1.50	Granular	10.10	0.10	29	-	17.60	20.13	1.00	-	19.75	20.50	235.08	235.08	5.65	67.53	549.18	1031.20	412.48	167.43
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	235.08	235.08	5.65	69.85	612.18	1164.06	465.62	189.36
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	235.08	235.08	5.65	69.85	612.18	1233.91	493.56	211.29
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	235.08	235.08	5.65	69.85	612.18	1303.77	521.51	233.23
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	235.08	235.08	5.65	69.85	612.18	1373.62	549.45	255.16
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	235.08	235.08	5.65	69.85	612.18	1443.48	577.39	277.10
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	235.08	235.08	5.65	69.85	612.18	1513.33	605.33	299.03
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	235.08	235.08	5.65	69.85	612.18	1583.19	633.27	320.97
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	235.08	235.08	5.65	69.85	612.18	1653.04	661.22	342.90
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	235.08	235.08	5.65	69.85	612.18	1722.90	689.16	364.84
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	235.08	235.08	3.77	46.57	612.18	1769.47	707.79	379.46

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	32.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	34.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	35.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-49	-
Chainage	5+442	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	203.36	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Ground Water Table from OGL	13.30	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-49	1.00	20.50	18.00	18.00	286.44	130.75	10.74	2.68
BH-49	1.00	22.00	19.50	19.50	305.91	146.03	11.02	2.76
BH-49	1.00	23.50	21.00	21.00	325.38	161.31	11.58	2.89
BH-49	1.00	25.00	22.50	22.50	344.80	176.59	11.58	2.89
BH-49	1.00	26.50	24.00	24.00	364.27	191.87	11.85	2.96
BH-49	1.00	28.00	25.50	25.50	383.74	207.15	11.85	2.96
BH-49	1.00	29.50	27.00	27.00	419.07	222.90	11.85	2.96
BH-49	1.00	31.00	28.50	28.50	439.21	238.64	11.85	2.96
BH-49	1.00	32.50	30.00	30.00	459.36	254.39	12.12	3.03
BH-49	1.00	34.00	31.50	31.50	479.50	270.14	12.12	3.03
BH-49	1.00	35.00	32.50	32.50	492.93	280.64	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	4.71	2.65	28.74	31.38	12.55	5.14
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	4.71	7.94	50.73	61.32	24.53	9.01
3	5.50	7.00	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	65.20	79.10	4.71	13.45	75.13	99.17	39.67	14.43
4	7.00	8.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	92.99	106.89	4.71	19.19	98.97	142.20	56.88	21.45
5	8.50	10.00	1.50	Granular	18.53	0.05	28	-	15.70	17.82	1.00	-	9.25	10.00	120.79	134.69	4.71	27.92	200.60	271.75	108.70	30.92
6	10.00	11.50	1.50	Granular	18.53	0.05	28	-	15.70	17.82	1.00	-	10.75	11.50	148.58	162.48	4.71	34.34	239.64	345.12	138.05	42.18
7	11.50	13.00	1.50	Granular	18.53	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	176.38	190.28	4.71	40.76	278.67	424.92	169.97	55.24
8	13.00	14.50	1.50	Granular	8.72	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	196.82	203.36	4.71	45.49	290.98	482.72	193.09	69.63
9	14.50	16.00	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	203.36	203.36	4.71	48.68	329.65	570.07	228.03	84.91
10	16.00	17.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	203.36	203.36	4.71	48.68	329.65	618.74	247.50	100.19
11	17.50	19.00	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	203.36	203.36	4.71	48.68	329.65	667.42	266.97	115.47
12	19.00	20.50	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	203.36	203.36	4.71	48.68	329.65	716.10	286.44	130.75
13	20.50	22.00	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	21.25	22.00	203.36	203.36	4.71	48.68	329.65	764.78	305.91	146.03
14	22.00	23.50	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	22.75	23.50	203.36	203.36	4.71	48.68	329.65	813.46	325.38	161.31
15	23.50	25.00	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	24.25	25.00	203.36	203.36	4.71	48.68	329.50	861.99	344.80	176.59
16	25.00	26.50	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	25.75	26.50	203.36	203.36	4.71	48.68	329.50	910.67	364.27	191.87
17	26.50	28.00	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	27.25	28.00	203.36	203.36	4.71	48.68	329.50	959.35	383.74	207.15
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	203.36	203.36	4.71	50.36	367.46	1047.67	419.07	222.90
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	203.36	203.36	4.71	50.36	367.46	1098.03	439.21	238.64
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	203.36	203.36	4.71	50.36	367.46	1148.39	459.36	254.39
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	203.36	203.36	4.71	50.36	367.46	1198.75	479.50	270.14
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	203.36	203.36	3.14	33.57	367.46	1232.32	492.93	280.64

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
2	22.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
3	23.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-49	-
Chainage	5+442	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	233.67	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	13.30	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-49	1.20	20.50	18.00	18.00	414.33	169.62	14.06	3.51
BH-49	1.20	22.00	19.50	19.50	441.18	190.79	14.43	3.61
BH-49	1.20	23.50	21.00	21.00	468.03	211.96	15.15	3.79
BH-49	1.20	25.00	22.50	22.50	494.77	233.13	15.15	3.79
BH-49	1.20	26.50	24.00	24.00	521.62	254.30	15.51	3.88
BH-49	1.20	28.00	25.50	25.50	548.47	275.47	15.51	3.88
BH-49	1.20	29.50	27.00	27.00	601.40	297.28	15.51	3.88
BH-49	1.20	31.00	28.50	28.50	629.17	319.10	15.51	3.88
BH-49	1.20	32.50	30.00	30.00	656.95	340.92	15.86	3.96
BH-49	1.20	34.00	31.50	31.50	684.72	362.74	15.86	3.96
BH-49	1.20	35.00	32.50	32.50	703.24	377.28	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	5.65	3.18	43.32	46.50	18.60	7.22
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	5.65	9.53	75.00	87.70	35.08	12.27
3	5.50	7.00	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	65.20	79.10	5.65	16.14	110.30	139.14	55.66	19.16
4	7.00	8.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	92.99	106.89	5.65	23.03	144.62	196.50	78.60	27.98
5	8.50	10.00	1.50	Granular	18.53	0.05	28	-	15.70	17.82	1.00	-	9.25	10.00	120.79	134.69	5.65	33.50	292.17	377.55	151.02	39.74
6	10.00	11.50	1.50	Granular	18.53	0.05	28	-	15.70	17.82	1.00	-	10.75	11.50	148.58	162.48	5.65	41.21	348.38	474.96	189.99	53.65
7	11.50	13.00	1.50	Granular	18.53	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	176.38	190.28	5.65	48.92	404.59	580.09	232.03	69.72
8	13.00	14.50	1.50	Granular	8.72	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	196.82	203.36	5.65	54.59	420.56	650.65	260.26	87.38
9	14.50	16.00	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	210.94	218.52	5.65	60.59	511.33	802.01	320.80	106.72
10	16.00	17.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	226.09	233.67	5.65	64.94	545.96	901.58	360.63	127.28
11	17.50	19.00	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	233.67	233.67	5.65	67.12	545.96	968.70	387.48	148.45
12	19.00	20.50	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	233.67	233.67	5.65	67.12	545.96	1035.82	414.33	169.62
13	20.50	22.00	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	21.25	22.00	233.67	233.67	5.65	67.12	545.96	1102.94	441.18	190.79
14	22.00	23.50	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	22.75	23.50	233.67	233.67	5.65	67.12	545.96	1170.07	468.03	211.96
15	23.50	25.00	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	24.25	25.00	233.67	233.67	5.65	67.12	545.71	1236.94	494.77	233.13
16	25.00	26.50	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	25.75	26.50	233.67	233.67	5.65	67.12	545.71	1304.06	521.62	254.30
17	26.50	28.00	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	27.25	28.00	233.67	233.67	5.65	67.12	545.71	1371.18	548.47	275.47
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	233.67	233.67	5.65	69.44	608.58	1503.49	601.40	297.28
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	233.67	233.67	5.65	69.44	608.58	1572.93	629.17	319.10
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	233.67	233.67	5.65	69.44	608.58	1642.37	656.95	340.92
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	233.67	233.67	5.65	69.44	608.58	1711.80	684.72	362.74
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	233.67	233.67	3.77	46.29	608.58	1758.09	703.24	377.28

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
2	22.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
3	23.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-50	-
Chainage	5+532	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	205.36	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-50	1.00	20.50	18.00	16.50	252.56	127.56	11.70	2.93
BH-50	1.00	22.00	19.50	18.00	286.81	142.50	12.01	3.00
BH-50	1.00	23.50	21.00	19.50	305.79	157.44	12.32	3.08
BH-50	1.00	25.00	22.50	21.00	324.78	172.37	12.63	3.16
BH-50	1.00	26.50	24.00	22.50	343.76	187.31	12.63	3.16
BH-50	1.00	28.00	25.50	24.00	394.70	203.20	12.93	3.23
BH-50	1.00	29.50	27.00	25.50	415.04	219.09	12.93	3.23
BH-50	1.00	31.00	28.50	27.00	435.38	234.98	12.93	3.23
BH-50	1.00	32.50	30.00	28.50	455.72	250.86	13.23	3.31
BH-50	1.00	34.00	31.50	30.00	476.06	266.75	13.23	3.31
BH-50	1.00	35.00	32.50	31.00	489.62	277.34	13.23	3.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	4.71	7.94	50.73	58.67	23.47	8.27
3	5.50	7.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	64.13	76.95	4.71	13.23	72.73	93.90	37.56	13.63
4	7.00	8.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	90.85	104.75	4.71	18.75	97.13	137.05	54.82	20.52
5	8.50	10.00	1.50	Granular	18.53	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	118.64	132.54	4.71	26.44	172.05	238.41	95.36	29.58
6	10.00	11.50	1.50	Granular	18.53	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	146.44	160.34	4.71	32.64	206.02	305.01	122.01	40.36
7	11.50	13.00	1.50	Granular	19.91	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	175.27	190.20	4.71	40.51	279.42	418.92	167.57	53.36
8	13.00	14.50	1.50	Granular	10.10	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	197.78	205.36	4.71	45.71	294.63	479.85	191.94	67.80
9	14.50	16.00	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	205.36	205.36	4.71	49.16	332.81	567.18	226.87	83.22
10	16.00	17.50	1.50	Granular	9.89	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	205.36	205.36	4.71	49.16	332.67	616.19	246.48	98.63
11	17.50	19.00	1.50	Granular	9.89	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	205.36	205.36	4.71	45.77	256.34	585.63	234.25	113.09
12	19.00	20.50	1.50	Granular	9.89	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	205.36	205.36	4.71	45.77	256.34	631.40	252.56	127.56
13	20.50	22.00	1.50	Granular	9.89	0.06	28	-	15.70	17.82	1.00	-	21.25	22.00	205.36	205.36	4.71	47.46	294.50	717.02	286.81	142.50
14	22.00	23.50	1.50	Granular	9.89	0.06	28	-	15.70	17.82	1.00	-	22.75	23.50	205.36	205.36	4.71	47.46	294.50	764.49	305.79	157.44
15	23.50	25.00	1.50	Granular	9.89	0.12	28	-	15.70	17.82	1.00	-	24.25	25.00	205.36	205.36	4.71	47.46	294.50	811.95	324.78	172.37
16	25.00	26.50	1.50	Granular	9.89	0.12	28	-	15.70	17.82	1.00	-	25.75	26.50	205.36	205.36	4.71	47.46	294.50	859.41	343.76	187.31
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	205.36	205.36	4.71	50.85	370.99	986.75	394.70	203.20
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	205.36	205.36	4.71	50.85	370.99	1037.60	415.04	219.09
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	205.36	205.36	4.71	50.85	370.99	1088.45	435.38	234.98
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	205.36	205.36	4.71	50.85	370.99	1139.31	455.72	250.86
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	205.36	205.36	4.71	50.85	370.99	1190.16	476.06	266.75
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	205.36	205.36	3.14	33.90	370.99	1224.06	489.62	277.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
2	22.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32
5	26.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-50	-
Chainage	5+532	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.35	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-50	1.20	20.50	18.00	16.50	359.30	165.40	15.22	3.81
BH-50	1.20	22.00	19.50	18.00	410.62	186.05	15.63	3.91
BH-50	1.20	23.50	21.00	19.50	436.73	206.70	16.03	4.01
BH-50	1.20	25.00	22.50	21.00	462.84	227.35	16.43	4.11
BH-50	1.20	26.50	24.00	22.50	488.95	248.00	16.43	4.11
BH-50	1.20	28.00	25.50	24.00	567.47	269.96	16.82	4.20
BH-50	1.20	29.50	27.00	25.50	595.44	291.92	16.82	4.20
BH-50	1.20	31.00	28.50	27.00	623.42	313.87	16.82	4.20
BH-50	1.20	32.50	30.00	28.50	651.39	335.83	17.20	4.30
BH-50	1.20	34.00	31.50	30.00	679.36	357.79	17.20	4.30
BH-50	1.20	35.00	32.50	31.00	698.01	372.43	17.20	4.30

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	38.48	51.30	5.65	9.53	75.00	84.52	33.81	11.38
3	5.50	7.00	1.50	Granular	17.10	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	64.13	76.95	5.65	15.88	106.67	132.08	52.83	18.20
4	7.00	8.50	1.50	Granular	18.53	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	90.85	104.75	5.65	22.50	141.97	189.88	75.95	26.87
5	8.50	10.00	1.50	Granular	18.53	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	118.64	132.54	5.65	31.73	250.66	330.29	132.12	38.13
6	10.00	11.50	1.50	Granular	18.53	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	146.44	160.34	5.65	39.16	299.57	418.36	167.35	51.47
7	11.50	13.00	1.50	Granular	19.91	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	175.27	190.20	5.65	48.61	405.91	573.31	229.33	67.46
8	13.00	14.50	1.50	Granular	10.10	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	197.78	205.36	5.65	54.85	426.07	648.33	259.33	85.19
9	14.50	16.00	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	212.93	220.51	5.65	61.16	515.89	799.31	319.73	104.69
10	16.00	17.50	1.50	Granular	9.89	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	227.93	235.35	5.65	65.47	549.54	898.44	359.38	125.40
11	17.50	19.00	1.50	Granular	9.89	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	235.35	235.35	5.65	62.94	423.46	835.30	334.12	145.40
12	19.00	20.50	1.50	Granular	9.89	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	235.35	235.35	5.65	62.94	423.46	898.24	359.30	165.40
13	20.50	22.00	1.50	Granular	9.89	0.06	28	-	15.70	17.82	1.00	-	21.25	22.00	235.35	235.35	5.65	65.27	486.50	1026.55	410.62	186.05
14	22.00	23.50	1.50	Granular	9.89	0.06	28	-	15.70	17.82	1.00	-	22.75	23.50	235.35	235.35	5.65	65.27	486.50	1091.83	436.73	206.70
15	23.50	25.00	1.50	Granular	9.89	0.12	28	-	15.70	17.82	1.00	-	24.25	25.00	235.35	235.35	5.65	65.27	486.50	1157.10	462.84	227.35
16	25.00	26.50	1.50	Granular	9.89	0.12	28	-	15.70	17.82	1.00	-	25.75	26.50	235.35	235.35	5.65	65.27	486.50	1222.37	488.95	248.00
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	235.35	235.35	5.65	69.94	612.86	1418.67	567.47	269.96
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	235.35	235.35	5.65	69.94	612.86	1488.60	595.44	291.92
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	235.35	235.35	5.65	69.94	612.86	1558.54	623.42	313.87
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	235.35	235.35	5.65	69.94	612.86	1628.47	651.39	335.83
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	235.35	235.35	5.65	69.94	612.86	1698.41	679.36	357.79
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	235.35	235.35	3.77	46.62	612.86	1745.03	698.01	372.43

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
2	22.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43
5	26.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-41	-
Chainage	4+617	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	106.60	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-41	1.00	20.50	18.00	16.50	156.39	77.05	13.23	3.31
BH-41	1.00	22.00	19.50	18.00	166.95	86.09	13.52	3.38
BH-41	1.00	23.50	21.00	19.50	177.51	95.13	13.52	3.38
BH-41	1.00	25.00	22.50	21.00	188.07	104.17	13.52	3.38
BH-41	1.00	26.50	24.00	22.50	198.63	113.21	13.81	3.45
BH-41	1.00	28.00	25.50	24.00	209.19	122.25	13.81	3.45
BH-41	1.00	29.50	27.00	25.50	219.75	131.29	13.81	3.45
BH-41	1.00	31.00	28.50	27.00	230.31	140.33	13.81	3.45
BH-41	1.00	32.50	30.00	28.50	240.86	149.37	13.81	3.45
BH-41	1.00	34.00	31.50	30.00	251.42	158.41	13.81	3.45
BH-41	1.00	35.00	32.50	31.00	258.46	164.44	13.81	3.45

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	4.71	3.39	21.64	25.02	10.01	7.00
3	5.50	7.00	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	28.42	34.97	4.71	5.87	33.42	42.68	17.07	10.29
4	7.00	8.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	41.51	48.05	4.71	8.57	44.65	62.46	24.98	14.33
5	8.50	10.00	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	54.59	61.14	4.71	12.17	79.46	109.44	43.78	19.39
6	10.00	11.50	1.50	Granular	10.10	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	68.71	76.29	4.71	15.31	98.73	144.02	57.61	25.33
7	11.50	13.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	83.87	91.45	4.71	20.08	152.09	217.46	86.99	32.60
8	13.00	14.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	99.02	106.60	4.71	23.70	176.13	265.21	106.08	40.89
9	14.50	16.00	1.50	Granular	10.10	0.03	30	-	19.50	22.44	1.00	-	15.25	16.00	106.60	106.60	4.71	26.40	196.32	311.79	124.72	49.93
10	16.00	17.50	1.50	Granular	10.10	0.03	30	-	19.50	22.44	1.00	-	16.75	17.50	106.60	106.60	4.71	26.40	196.32	338.19	135.28	58.97
11	17.50	19.00	1.50	Granular	10.10	0.07	30	-	19.50	22.44	1.00	-	18.25	19.00	106.60	106.60	4.71	26.40	196.32	364.59	145.83	68.01
12	19.00	20.50	1.50	Granular	10.10	0.07	30	-	19.50	22.44	1.00	-	19.75	20.50	106.60	106.60	4.71	26.40	196.32	390.98	156.39	77.05
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	106.60	106.60	4.71	26.40	196.32	417.38	166.95	86.09
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	106.60	106.60	4.71	26.40	196.32	443.78	177.51	95.13
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	106.60	106.60	4.71	26.40	196.32	470.17	188.07	104.17
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	106.60	106.60	4.71	26.40	196.32	496.57	198.63	113.21
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	106.60	106.60	4.71	26.40	196.32	522.97	209.19	122.25
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	106.60	106.60	4.71	26.40	196.32	549.37	219.75	131.29
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	106.60	106.60	4.71	26.40	196.32	575.76	230.31	140.33
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	106.60	106.60	4.71	26.40	196.32	602.16	240.86	149.37
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	106.60	106.60	4.71	26.40	196.32	628.56	251.42	158.41
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	106.60	106.60	3.14	17.60	196.32	646.16	258.46	164.44

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
2	22.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	32.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	34.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
7	35.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-41	-
Chainage	4+617	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	136.91	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-41	1.20	20.50	18.00	16.50	249.10	105.43	17.20	4.30
BH-41	1.20	22.00	19.50	18.00	265.37	119.20	17.58	4.40
BH-41	1.20	23.50	21.00	19.50	281.65	132.97	17.58	4.40
BH-41	1.20	25.00	22.50	21.00	297.92	146.73	17.58	4.40
BH-41	1.20	26.50	24.00	22.50	314.19	160.50	17.96	4.49
BH-41	1.20	28.00	25.50	24.00	330.47	174.26	17.96	4.49
BH-41	1.20	29.50	27.00	25.50	346.74	188.03	17.96	4.49
BH-41	1.20	31.00	28.50	27.00	363.01	201.80	17.96	4.49
BH-41	1.20	32.50	30.00	28.50	379.29	215.56	17.96	4.49
BH-41	1.20	34.00	31.50	30.00	395.56	229.33	17.96	4.49
BH-41	1.20	35.00	32.50	31.00	406.41	238.51	17.96	4.49

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	5.65	4.06	31.99	36.05	14.42	9.85
3	5.50	7.00	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	28.42	34.97	5.65	7.04	49.12	60.22	24.09	14.19
4	7.00	8.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	41.51	48.05	5.65	10.28	65.28	86.66	34.66	19.45
5	8.50	10.00	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	54.59	61.14	5.65	14.60	115.78	151.76	60.71	25.91
6	10.00	11.50	1.50	Granular	10.10	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	68.71	76.29	5.65	18.38	143.75	198.11	79.24	33.43
7	11.50	13.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	83.87	91.45	5.65	24.09	221.03	299.48	119.79	42.55
8	13.00	14.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	99.02	106.60	5.65	28.44	255.65	362.54	145.02	52.89
9	14.50	16.00	1.50	Granular	10.10	0.03	30	-	19.50	22.44	1.00	-	15.25	16.00	114.18	121.76	5.65	33.93	323.53	464.35	185.74	64.76
10	16.00	17.50	1.50	Granular	10.10	0.03	30	-	19.50	22.44	1.00	-	16.75	17.50	129.33	136.91	5.65	38.43	362.13	541.39	216.55	77.90
11	17.50	19.00	1.50	Granular	10.10	0.07	30	-	19.50	22.44	1.00	-	18.25	19.00	136.91	136.91	5.65	40.68	362.13	582.07	232.83	91.67
12	19.00	20.50	1.50	Granular	10.10	0.07	30	-	19.50	22.44	1.00	-	19.75	20.50	136.91	136.91	5.65	40.68	362.13	622.75	249.10	105.43
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	136.91	136.91	5.65	40.68	362.13	663.44	265.37	119.20
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	136.91	136.91	5.65	40.68	362.13	704.12	281.65	132.97
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	136.91	136.91	5.65	40.68	362.13	744.80	297.92	146.73
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	136.91	136.91	5.65	40.68	362.13	785.49	314.19	160.50
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	136.91	136.91	5.65	40.68	362.13	826.17	330.47	174.26
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	136.91	136.91	5.65	40.68	362.13	866.85	346.74	188.03
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	136.91	136.91	5.65	40.68	362.13	907.54	363.01	201.80
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	136.91	136.91	5.65	40.68	362.13	948.22	379.29	215.56
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	136.91	136.91	5.65	40.68	362.13	988.90	395.56	229.33
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	136.91	136.91	3.77	27.12	362.13	1016.03	406.41	238.51

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
2	22.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	32.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	34.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
7	35.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-42	-
Chainage	4+751	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	101.73	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-42	1.00	20.50	18.00	16.50	151.12	75.77	13.52	3.38
BH-42	1.00	22.00	19.50	18.00	161.19	84.47	13.52	3.38
BH-42	1.00	23.50	21.00	19.50	171.27	93.17	13.81	3.45
BH-42	1.00	25.00	22.50	21.00	181.34	101.88	13.81	3.45
BH-42	1.00	26.50	24.00	22.50	191.42	110.58	13.81	3.45
BH-42	1.00	28.00	25.50	24.00	201.50	119.28	14.09	3.52
BH-42	1.00	29.50	27.00	25.50	211.57	127.98	14.09	3.52
BH-42	1.00	31.00	28.50	27.00	221.65	136.69	14.09	3.52
BH-42	1.00	32.50	30.00	28.50	231.72	145.39	14.09	3.52
BH-42	1.00	34.00	31.50	30.00	241.80	154.09	14.09	3.52
BH-42	1.00	35.00	32.50	31.00	248.52	159.89	14.09	3.52

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	6.15	12.29	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.24	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	18.47	24.66	4.71	3.81	24.39	28.20	11.28	7.11
3	5.50	7.00	1.50	Granular	8.24	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	30.84	37.02	4.71	6.62	42.36	52.79	21.12	10.62
4	7.00	8.50	1.50	Granular	8.24	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	43.20	49.39	4.71	9.27	55.22	74.92	29.97	14.86
5	8.50	10.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	55.93	62.47	4.71	12.93	93.12	125.75	50.30	20.13
6	10.00	11.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	69.01	75.56	4.71	15.95	111.50	160.08	64.03	26.25
7	11.50	13.00	1.50	Granular	8.72	0.02	29	-	17.60	20.13	1.00	-	12.25	13.00	82.10	88.64	4.71	19.65	146.68	214.91	85.96	33.40
8	13.00	14.50	1.50	Granular	8.72	0.02	29	-	17.60	20.13	1.00	-	13.75	14.50	95.18	101.73	4.71	22.78	167.44	258.46	103.38	41.43
9	14.50	16.00	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	101.73	101.73	4.71	24.35	168.40	283.76	113.51	49.90
10	16.00	17.50	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	101.73	101.73	4.71	24.35	168.40	308.11	123.25	58.36
11	17.50	19.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	101.73	101.73	4.71	25.19	187.69	352.60	141.04	67.07
12	19.00	20.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	101.73	101.73	4.71	25.19	187.69	377.79	151.12	75.77
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	101.73	101.73	4.71	25.19	187.69	402.98	161.19	84.47
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	101.73	101.73	4.71	25.19	187.69	428.17	171.27	93.17
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	101.73	101.73	4.71	25.19	187.69	453.36	181.34	101.88
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	101.73	101.73	4.71	25.19	187.69	478.55	191.42	110.58
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	101.73	101.73	4.71	25.19	187.69	503.74	201.50	119.28
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	101.73	101.73	4.71	25.19	187.69	528.93	211.57	127.98
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	101.73	101.73	4.71	25.19	187.69	554.12	221.65	136.69
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	101.73	101.73	4.71	25.19	187.69	579.31	231.72	145.39
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	101.73	101.73	4.71	25.19	187.69	604.50	241.80	154.09
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	101.73	101.73	3.14	16.79	187.69	621.29	248.52	159.89

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
2	22.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47
3	23.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
4	25.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	1.26	1.99	1.82	6.33	5.81	0.145	0.579	13.81	3.45	43.69	20.07	33.14	8.29	104.85	48.16
6	28.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	29.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	31.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	32.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	34.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83
7	35.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	1.26	1.99	1.82	6.28	5.77	0.142	0.568	14.09	3.52	44.29	20.35	33.83	8.46	106.30	48.83

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-42	-
Chainage	4+751	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.04	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-42	1.20	20.50	18.00	16.50	241.82	103.81	17.58	4.40
BH-42	1.20	22.00	19.50	18.00	257.51	117.17	17.58	4.40
BH-42	1.20	23.50	21.00	19.50	273.21	130.53	17.96	4.49
BH-42	1.20	25.00	22.50	21.00	288.90	143.89	17.96	4.49
BH-42	1.20	26.50	24.00	22.50	304.60	157.26	17.96	4.49
BH-42	1.20	28.00	25.50	24.00	320.29	170.62	18.33	4.58
BH-42	1.20	29.50	27.00	25.50	335.98	183.98	18.33	4.58
BH-42	1.20	31.00	28.50	27.00	351.68	197.34	18.33	4.58
BH-42	1.20	32.50	30.00	28.50	367.37	210.70	18.33	4.58
BH-42	1.20	34.00	31.50	30.00	383.07	224.06	18.33	4.58
BH-42	1.20	35.00	32.50	31.00	393.53	232.97	18.33	4.58

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	6.15	12.29	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.24	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	18.47	24.66	5.65	4.57	36.06	40.64	16.25	9.99
3	5.50	7.00	1.50	Granular	8.24	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	30.84	37.02	5.65	7.94	62.11	74.63	29.85	14.59
4	7.00	8.50	1.50	Granular	8.24	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	43.20	49.39	5.65	11.13	80.63	104.27	41.71	20.08
5	8.50	10.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	55.93	62.47	5.65	15.51	135.65	174.81	69.92	26.80
6	10.00	11.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	69.01	75.56	5.65	19.14	162.11	220.41	88.16	34.53
7	11.50	13.00	1.50	Granular	8.72	0.02	29	-	17.60	20.13	1.00	-	12.25	13.00	82.10	88.64	5.65	23.58	212.96	294.84	117.94	43.51
8	13.00	14.50	1.50	Granular	8.72	0.02	29	-	17.60	20.13	1.00	-	13.75	14.50	95.18	101.73	5.65	27.34	242.86	352.08	140.83	53.54
9	14.50	16.00	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	109.30	116.88	5.65	31.40	279.14	419.75	167.90	64.71
10	16.00	17.50	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	124.46	132.04	5.65	35.75	313.76	490.12	196.05	77.09
11	17.50	19.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	132.04	132.04	5.65	39.23	349.72	565.32	226.13	90.45
12	19.00	20.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	132.04	132.04	5.65	39.23	349.72	604.55	241.82	103.81
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	132.04	132.04	5.65	39.23	349.72	643.79	257.51	117.17
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	132.04	132.04	5.65	39.23	349.72	683.02	273.21	130.53
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	132.04	132.04	5.65	39.23	349.72	722.26	288.90	143.89
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	132.04	132.04	5.65	39.23	349.72	761.49	304.60	157.26
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	132.04	132.04	5.65	39.23	349.72	800.72	320.29	170.62
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	132.04	132.04	5.65	39.23	349.72	839.96	335.98	183.98
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	132.04	132.04	5.65	39.23	349.72	879.19	351.68	197.34
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	132.04	132.04	5.65	39.23	349.72	918.43	367.37	210.70
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	132.04	132.04	5.65	39.23	349.72	957.66	383.07	224.06
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	132.04	132.04	3.77	26.16	349.72	983.82	393.53	232.97

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
2	22.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66
3	23.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
4	25.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	1.09	2.01	1.83	7.39	6.75	0.111	0.446	17.96	4.49	66.38	30.29	43.10	10.77	159.30	72.70
6	28.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	29.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	31.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	32.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	34.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72
7	35.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	1.09	2.00	1.83	7.34	6.70	0.109	0.436	18.33	4.58	67.29	30.72	43.99	11.00	161.49	73.72

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-43	-
Chainage	4+833	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.01	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-43	1.00	20.50	18.00	18.00	132.20	75.90	11.85	2.96
BH-43	1.00	22.00	19.50	19.50	159.37	84.92	12.12	3.03
BH-43	1.00	23.50	21.00	21.00	169.91	93.94	12.39	3.10
BH-43	1.00	25.00	22.50	22.50	180.44	102.97	12.65	3.16
BH-43	1.00	26.50	24.00	24.00	190.97	111.99	12.65	3.16
BH-43	1.00	28.00	25.50	25.50	210.19	121.27	12.91	3.23
BH-43	1.00	29.50	27.00	27.00	221.09	130.54	12.91	3.23
BH-43	1.00	31.00	28.50	28.50	231.98	139.82	12.91	3.23
BH-43	1.00	32.50	30.00	30.00	242.88	149.10	12.91	3.23
BH-43	1.00	34.00	31.50	31.50	253.77	158.37	12.91	3.23
BH-43	1.00	35.00	32.50	32.50	261.04	164.56	12.91	3.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.15	12.29	4.71	1.12	8.64	9.76	3.90	4.71
2	4.00	5.50	1.50	Granular	8.24	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	18.47	24.66	4.71	3.35	16.04	20.51	8.20	7.30
3	5.50	7.00	1.50	Granular	8.24	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	30.84	37.02	4.71	6.11	31.14	41.72	16.69	10.66
4	7.00	8.50	1.50	Granular	8.24	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	43.20	49.39	4.71	8.56	40.68	59.82	23.93	14.70
5	8.50	10.00	1.50	Granular	10.10	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	56.96	64.54	4.71	12.22	71.85	103.21	41.28	19.78
6	10.00	11.50	1.50	Granular	10.10	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	72.12	79.70	4.71	15.48	87.61	134.45	53.78	25.76
7	11.50	13.00	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	87.27	94.85	4.71	20.17	139.45	206.46	82.58	33.06
8	13.00	14.50	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	102.43	110.01	4.71	23.67	160.73	251.42	100.57	41.33
9	14.50	16.00	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	110.01	110.01	4.71	25.42	160.73	276.84	110.74	50.10
10	16.00	17.50	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	110.01	110.01	4.71	25.42	160.73	302.26	120.91	58.87
11	17.50	19.00	1.50	Granular	10.10	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	110.01	110.01	4.71	24.52	139.93	305.98	122.39	67.39
12	19.00	20.50	1.50	Granular	10.10	0.08	27	-	13.80	15.50	1.00	-	19.75	20.50	110.01	110.01	4.71	24.52	139.93	330.49	132.20	75.90
13	20.50	22.00	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	110.01	110.01	4.71	26.33	181.54	398.43	159.37	84.92
14	22.00	23.50	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	110.01	110.01	4.71	26.33	181.54	424.77	169.91	93.94
15	23.50	25.00	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	110.01	110.01	4.71	26.33	181.54	451.10	180.44	102.97
16	25.00	26.50	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	25.75	26.50	110.01	110.01	4.71	26.33	181.54	477.43	190.97	111.99
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	110.01	110.01	4.71	27.24	202.34	525.47	210.19	121.27
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	110.01	110.01	4.71	27.24	202.34	552.71	221.09	130.54
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	110.01	110.01	4.71	27.24	202.34	579.96	231.98	139.82
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	110.01	110.01	4.71	27.24	202.34	607.20	242.88	149.10
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	110.01	110.01	4.71	27.24	202.34	634.44	253.77	158.37
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	110.01	110.01	3.14	18.16	202.34	652.60	261.04	164.56

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
6	28.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	29.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	31.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	32.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	34.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	35.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-43	-
Chainage	4+833	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	140.32	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-43	1.20	20.50	18.00	18.00	203.89	103.38	15.51	3.88
BH-43	1.20	22.00	19.50	19.50	250.51	117.04	15.86	3.96
BH-43	1.20	23.50	21.00	21.00	266.63	130.70	16.20	4.05
BH-43	1.20	25.00	22.50	22.50	282.76	144.36	16.54	4.14
BH-43	1.20	26.50	24.00	24.00	298.88	158.02	16.54	4.14
BH-43	1.20	28.00	25.50	25.50	330.81	172.07	16.88	4.22
BH-43	1.20	29.50	27.00	27.00	347.49	186.12	16.88	4.22
BH-43	1.20	31.00	28.50	28.50	364.16	200.17	16.88	4.22
BH-43	1.20	32.50	30.00	30.00	380.84	214.22	16.88	4.22
BH-43	1.20	34.00	31.50	31.50	397.52	228.27	16.88	4.22
BH-43	1.20	35.00	32.50	32.50	408.64	237.64	16.88	4.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.15	12.29	5.65	1.34	12.81	14.15	5.66	6.71
2	4.00	5.50	1.50	Granular	8.24	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	18.47	24.66	5.65	4.03	23.47	28.84	11.54	10.21
3	5.50	7.00	1.50	Granular	8.24	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	30.84	37.02	5.65	7.33	45.59	58.29	23.32	14.64
4	7.00	8.50	1.50	Granular	8.24	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	43.20	49.39	5.65	10.27	59.32	82.29	32.92	19.89
5	8.50	10.00	1.50	Granular	10.10	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	56.96	64.54	5.65	14.67	104.83	142.46	56.99	26.37
6	10.00	11.50	1.50	Granular	10.10	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	72.12	79.70	5.65	18.57	127.52	183.73	73.49	33.95
7	11.50	13.00	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	87.27	94.85	5.65	24.20	202.61	283.02	113.21	43.10
8	13.00	14.50	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	102.43	110.01	5.65	28.41	233.25	342.07	136.83	53.43
9	14.50	16.00	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	117.58	125.16	5.65	32.61	263.90	405.33	162.13	64.93
10	16.00	17.50	1.50	Granular	10.10	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	132.74	140.32	5.65	36.81	294.55	472.79	189.12	77.62
11	17.50	19.00	1.50	Granular	10.10	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	140.32	140.32	5.65	37.53	256.42	472.19	188.88	90.50
12	19.00	20.50	1.50	Granular	10.10	0.08	27	-	13.80	15.50	1.00	-	19.75	20.50	140.32	140.32	5.65	37.53	256.42	509.71	203.89	103.38
13	20.50	22.00	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	140.32	140.32	5.65	40.31	332.68	626.28	250.51	117.04
14	22.00	23.50	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	140.32	140.32	5.65	40.31	332.68	666.58	266.63	130.70
15	23.50	25.00	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	140.32	140.32	5.65	40.31	332.68	706.89	282.76	144.36
16	25.00	26.50	1.50	Granular	10.10	0.03	29	-	17.60	20.13	1.00	-	25.75	26.50	140.32	140.32	5.65	40.31	332.68	747.19	298.88	158.02
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	140.32	140.32	5.65	41.70	370.81	827.02	330.81	172.07
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	140.32	140.32	5.65	41.70	370.81	868.71	347.49	186.12
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	140.32	140.32	5.65	41.70	370.81	910.41	364.16	200.17
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	140.32	140.32	5.65	41.70	370.81	952.11	380.84	214.22
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	140.32	140.32	5.65	41.70	370.81	993.80	397.52	228.27
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	140.32	140.32	3.77	27.80	370.81	1021.60	408.64	237.64

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
6	28.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	29.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	31.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	32.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	34.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	35.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-44	-
Chainage	4+910	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.10	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-44	1.00	20.50	18.00	18.00	153.82	79.35	11.58	2.89
BH-44	1.00	22.00	19.50	19.50	173.05	88.63	11.85	2.96
BH-44	1.00	23.50	21.00	21.00	183.96	97.91	12.12	3.03
BH-44	1.00	25.00	22.50	22.50	194.86	107.19	12.39	3.10
BH-44	1.00	26.50	24.00	24.00	205.77	116.48	12.39	3.10
BH-44	1.00	28.00	25.50	25.50	216.67	125.76	12.65	3.16
BH-44	1.00	29.50	27.00	27.00	227.58	135.04	12.65	3.16
BH-44	1.00	31.00	28.50	28.50	238.48	144.33	12.65	3.16
BH-44	1.00	32.50	30.00	30.00	249.39	153.61	12.65	3.16
BH-44	1.00	34.00	31.50	31.50	260.29	162.89	12.65	3.16
BH-44	1.00	35.00	32.50	32.50	267.56	169.08	12.65	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.06	26	-	11.90	13.19	1.00	-	3.25	4.00	6.15	12.29	4.71	1.32	16.62	17.94	7.18	4.77
2	4.00	5.50	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	4.75	5.50	18.83	25.38	4.71	4.04	30.48	35.84	14.33	7.55
3	5.50	7.00	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	31.92	38.46	4.71	6.85	44.08	56.29	22.52	11.12
4	7.00	8.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	7.75	8.50	45.00	51.55	4.71	10.40	77.78	100.39	40.16	15.68
5	8.50	10.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	58.09	64.63	4.71	13.43	96.16	132.19	52.88	21.09
6	10.00	11.50	1.50	Granular	10.10	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	72.21	79.79	4.71	16.69	118.29	171.02	68.41	27.41
7	11.50	13.00	1.50	Granular	10.10	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	87.36	94.94	4.71	20.19	139.58	212.49	85.00	34.71
8	13.00	14.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	102.52	110.10	4.71	24.54	181.68	279.14	111.65	43.23
9	14.50	16.00	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	110.10	110.10	4.71	26.35	181.68	305.49	122.20	52.26
10	16.00	17.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	110.10	110.10	4.71	26.35	181.68	331.84	132.74	61.29
11	17.50	19.00	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	110.10	110.10	4.71	26.35	181.68	358.20	143.28	70.32
12	19.00	20.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	110.10	110.10	4.71	26.35	181.68	384.55	153.82	79.35
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	110.10	110.10	4.71	27.26	202.50	432.63	173.05	88.63
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	110.10	110.10	4.71	27.26	202.50	459.90	183.96	97.91
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	110.10	110.10	4.71	27.26	202.50	487.16	194.86	107.19
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	110.10	110.10	4.71	27.26	202.50	514.42	205.77	116.48
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	110.10	110.10	4.71	27.26	202.50	541.68	216.67	125.76
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	110.10	110.10	4.71	27.26	202.50	568.95	227.58	135.04
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	110.10	110.10	4.71	27.26	202.50	596.21	238.48	144.33
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	110.10	110.10	4.71	27.26	202.50	623.47	249.39	153.61
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	110.10	110.10	4.71	27.26	202.50	650.74	260.29	162.89
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	110.10	110.10	3.14	18.18	202.50	668.91	267.56	169.08

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
2	22.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
3	23.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	32.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	34.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	35.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-44	-
Chainage	4+910	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	140.41	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-44	1.20	20.50	18.00	18.00	240.98	107.94	15.15	3.79
BH-44	1.20	22.00	19.50	19.50	272.93	121.99	15.51	3.88
BH-44	1.20	23.50	21.00	21.00	289.62	136.05	15.86	3.96
BH-44	1.20	25.00	22.50	22.50	306.31	150.11	16.20	4.05
BH-44	1.20	26.50	24.00	24.00	323.00	164.17	16.20	4.05
BH-44	1.20	28.00	25.50	25.50	339.68	178.22	16.54	4.14
BH-44	1.20	29.50	27.00	27.00	356.37	192.28	16.54	4.14
BH-44	1.20	31.00	28.50	28.50	373.06	206.34	16.54	4.14
BH-44	1.20	32.50	30.00	30.00	389.75	220.40	16.54	4.14
BH-44	1.20	34.00	31.50	31.50	406.44	234.45	16.54	4.14
BH-44	1.20	35.00	32.50	32.50	417.57	243.82	16.54	4.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion (C)	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.19	0.06	26	-	11.90	13.19	1.00	-	3.25	4.00	6.15	12.29	5.65	1.58	25.04	26.63	10.65	6.78
2	4.00	5.50	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	4.75	5.50	18.83	25.38	5.65	4.85	45.06	51.50	20.60	10.51
3	5.50	7.00	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	31.92	38.46	5.65	8.22	64.66	79.31	31.72	15.19
4	7.00	8.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	7.75	8.50	45.00	51.55	5.65	12.48	113.56	140.69	56.28	21.06
5	8.50	10.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	58.09	64.63	5.65	16.11	140.02	183.27	73.31	27.94
6	10.00	11.50	1.50	Granular	10.10	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	72.21	79.79	5.65	20.03	172.14	235.41	94.17	35.92
7	11.50	13.00	1.50	Granular	10.10	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	87.36	94.94	5.65	24.23	202.79	290.29	116.12	45.08
8	13.00	14.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	13.75	14.50	102.52	110.10	5.65	29.45	263.64	380.58	152.23	55.70
9	14.50	16.00	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	15.25	16.00	117.67	125.25	5.65	33.80	298.26	449.01	179.60	67.54
10	16.00	17.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	16.75	17.50	132.83	140.41	5.65	38.15	332.88	521.79	208.71	80.60
11	17.50	19.00	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	140.41	140.41	5.65	40.33	332.88	562.12	224.85	94.27
12	19.00	20.50	1.50	Granular	10.10	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	140.41	140.41	5.65	40.33	332.88	602.45	240.98	107.94
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	140.41	140.41	5.65	41.72	371.04	682.32	272.93	121.99
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	140.41	140.41	5.65	41.72	371.04	724.05	289.62	136.05
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	140.41	140.41	5.65	41.72	371.04	765.77	306.31	150.11
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	140.41	140.41	5.65	41.72	371.04	807.49	323.00	164.17
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	140.41	140.41	5.65	41.72	371.04	849.21	339.68	178.22
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	140.41	140.41	5.65	41.72	371.04	890.93	356.37	192.28
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	140.41	140.41	5.65	41.72	371.04	932.66	373.06	206.34
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	140.41	140.41	5.65	41.72	371.04	974.38	389.75	220.40
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	140.41	140.41	5.65	41.72	371.04	1016.10	406.44	234.45
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	140.41	140.41	3.77	27.81	371.04	1043.91	417.57	243.82

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
2	22.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
3	23.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	32.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	34.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	35.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-45	-
Chainage	5+030	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.46	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-45	1.00	20.50	18.00	18.00	142.50	74.81	11.30	2.83
BH-45	1.00	22.00	19.50	19.50	160.42	83.57	11.58	2.89
BH-45	1.00	23.50	21.00	21.00	170.57	92.32	11.58	2.89
BH-45	1.00	25.00	22.50	22.50	180.65	101.07	11.58	2.89
BH-45	1.00	26.50	24.00	24.00	190.80	109.83	11.58	2.89
BH-45	1.00	28.00	25.50	25.50	200.95	118.58	11.85	2.96
BH-45	1.00	29.50	27.00	27.00	211.17	127.33	11.85	2.96
BH-45	1.00	31.00	28.50	28.50	221.31	136.09	11.85	2.96
BH-45	1.00	32.50	30.00	30.00	231.46	144.84	12.12	3.03
BH-45	1.00	34.00	31.50	31.50	241.61	153.60	12.12	3.03
BH-45	1.00	35.00	32.50	32.50	248.38	159.43	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	4.71	1.13	12.26	13.39	5.35	4.71
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	4.71	3.39	21.64	26.15	10.46	7.31
3	5.50	7.00	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	28.42	34.97	4.71	5.87	33.42	43.80	17.52	10.60
4	7.00	8.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	41.51	48.05	4.71	8.57	44.65	63.59	25.44	14.65
5	8.50	10.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	54.59	61.14	4.71	12.62	91.25	122.81	49.13	19.83
6	10.00	11.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	67.68	74.22	4.71	15.64	109.63	156.83	62.73	25.86
7	11.50	13.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	80.76	87.31	4.71	18.67	128.00	193.87	77.55	32.74
8	13.00	14.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	94.88	102.46	4.71	22.71	169.57	258.15	103.26	40.75
9	14.50	16.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	102.46	102.46	4.71	24.53	169.57	282.67	113.07	49.26
10	16.00	17.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	102.46	102.46	4.71	24.53	169.57	307.20	122.88	57.78
11	17.50	19.00	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	102.46	102.46	4.71	24.53	169.57	331.73	132.69	66.30
12	19.00	20.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	102.46	102.46	4.71	24.53	169.57	356.25	142.50	74.81
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	102.46	102.46	4.71	25.37	188.99	401.05	160.42	83.57
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	102.46	102.46	4.71	25.37	188.99	426.43	170.57	92.32
15	23.50	25.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	102.46	102.46	4.71	25.37	188.83	451.64	180.65	101.07
16	25.00	26.50	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	102.46	102.46	4.71	25.37	188.83	477.01	190.80	109.83
17	26.50	28.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	102.46	102.46	4.71	25.37	188.83	502.38	200.95	118.58
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	102.46	102.46	4.71	25.37	188.99	527.91	211.17	127.33
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	102.46	102.46	4.71	25.37	188.99	553.29	221.31	136.09
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	102.46	102.46	4.71	25.37	188.99	578.66	231.46	144.84
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	102.46	102.46	4.71	25.37	188.99	604.03	241.61	153.60
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	102.46	102.46	3.14	16.91	188.99	620.95	248.38	159.43

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
2	22.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
3	23.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-45	-
Chainage	5+030	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.77	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-45	1.20	20.50	18.00	18.00	226.23	102.50	14.79	3.70
BH-45	1.20	22.00	19.50	19.50	256.47	115.92	15.15	3.79
BH-45	1.20	23.50	21.00	21.00	272.26	129.34	15.15	3.79
BH-45	1.20	25.00	22.50	22.50	287.93	142.77	15.15	3.79
BH-45	1.20	26.50	24.00	24.00	303.71	156.19	15.15	3.79
BH-45	1.20	28.00	25.50	25.50	319.49	169.61	15.51	3.88
BH-45	1.20	29.50	27.00	27.00	335.38	183.03	15.51	3.88
BH-45	1.20	31.00	28.50	28.50	351.16	196.45	15.51	3.88
BH-45	1.20	32.50	30.00	30.00	366.94	209.88	15.86	3.96
BH-45	1.20	34.00	31.50	31.50	382.73	223.30	15.86	3.96
BH-45	1.20	35.00	32.50	32.50	393.25	232.25	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	5.65	1.35	18.48	19.83	7.93	6.71
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	5.65	4.06	31.99	37.41	14.96	10.23
3	5.50	7.00	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	28.42	34.97	5.65	7.04	49.12	61.58	24.63	14.57
4	7.00	8.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	41.51	48.05	5.65	10.28	65.28	88.01	35.21	19.82
5	8.50	10.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	54.59	61.14	5.65	15.14	132.95	170.83	68.33	26.44
6	10.00	11.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	67.68	74.22	5.65	18.77	159.41	216.06	86.42	34.07
7	11.50	13.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	80.76	87.31	5.65	22.40	185.88	264.92	105.97	42.72
8	13.00	14.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	94.88	102.46	5.65	27.25	246.19	352.49	141.00	52.72
9	14.50	16.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	110.04	117.62	5.65	31.61	280.82	418.72	167.49	63.95
10	16.00	17.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	125.19	132.77	5.65	35.96	315.44	489.31	195.72	76.39
11	17.50	19.00	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	132.77	132.77	5.65	38.14	315.44	527.45	210.98	89.45
12	19.00	20.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	132.77	132.77	5.65	38.14	315.44	565.58	226.23	102.50
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	132.77	132.77	5.65	39.45	351.59	641.19	256.47	115.92
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	132.77	132.77	5.65	39.45	351.59	680.64	272.26	129.34
15	23.50	25.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	132.77	132.77	5.65	39.45	351.31	719.81	287.93	142.77
16	25.00	26.50	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	132.77	132.77	5.65	39.45	351.31	759.27	303.71	156.19
17	26.50	28.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	132.77	132.77	5.65	39.45	351.31	798.72	319.49	169.61
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	132.77	132.77	5.65	39.45	351.59	838.45	335.38	183.03
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	132.77	132.77	5.65	39.45	351.59	877.91	351.16	196.45
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	132.77	132.77	5.65	39.45	351.59	917.36	366.94	209.88
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	132.77	132.77	5.65	39.45	351.59	956.81	382.73	223.30
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	132.77	132.77	3.77	26.30	351.59	983.12	393.25	232.25

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
2	22.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
3	23.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-45A	-
Chainage	5+080	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	93.96	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-45A	1.00	22.00	19.50	16.50	129.03	75.85	10.36	2.59
BH-45A	1.00	23.50	21.00	18.00	137.71	83.58	10.36	2.59
BH-45A	1.00	25.00	22.50	19.50	146.40	91.31	10.73	2.68
BH-45A	1.00	26.50	24.00	21.00	170.06	99.48	11.10	2.77
BH-45A	1.00	28.00	25.50	22.50	179.37	107.64	11.45	2.86
BH-45A	1.00	29.50	27.00	24.00	188.67	115.80	11.45	2.86
BH-45A	1.00	30.00	27.50	24.50	191.78	118.52	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.29	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	16.41	21.88	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.29	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	27.35	32.82	4.71	4.97	20.77	25.74	10.30	9.09
4	7.00	8.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	38.29	43.76	4.71	7.90	40.40	53.27	21.31	12.95
5	8.50	10.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	49.23	54.70	4.71	10.16	49.78	72.81	29.12	17.44
6	10.00	11.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	61.24	67.79	4.71	12.64	61.57	97.23	38.89	22.63
7	11.50	13.00	1.50	Granular	8.72	0.07	29	-	17.60	20.13	1.00	-	12.25	13.00	74.33	80.87	4.71	17.79	134.35	187.81	75.12	29.26
8	13.00	14.50	1.50	Granular	8.72	0.07	29	-	17.60	20.13	1.00	-	13.75	14.50	87.41	93.96	4.71	20.92	155.11	229.50	91.80	36.77
9	14.50	16.00	1.50	Granular	8.72	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	93.96	93.96	4.71	22.49	155.11	251.99	100.79	44.72
10	16.00	17.50	1.50	Granular	8.72	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	93.96	93.96	4.71	22.49	155.11	274.48	109.79	52.66
11	17.50	19.00	1.50	Granular	8.72	0.02	28	-	15.70	17.82	1.00	-	18.25	19.00	93.96	93.96	4.71	21.71	137.34	278.42	111.37	60.39
12	19.00	20.50	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	19.75	20.50	93.96	93.96	4.71	21.71	138.06	300.86	120.34	68.12
13	20.50	22.00	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	21.25	22.00	93.96	93.96	4.71	21.71	138.06	322.57	129.03	75.85
14	22.00	23.50	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	22.75	23.50	93.96	93.96	4.71	21.71	138.06	344.28	137.71	83.58
15	23.50	25.00	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	24.25	25.00	93.96	93.96	4.71	21.71	138.06	366.00	146.40	91.31
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	93.96	93.96	4.71	23.27	173.95	425.15	170.06	99.48
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	93.96	93.96	4.71	23.27	173.95	448.42	179.37	107.64
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	93.96	93.96	4.71	23.27	173.95	471.69	188.67	115.80
19	29.50	30.00	0.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	93.96	93.96	1.57	7.76	173.95	479.44	191.78	118.52

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
5	27.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-45A	-
Chainage	5+080	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	120.13	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-45A	1.20	22.00	19.50	16.50	201.68	105.03	13.46	3.36
BH-45A	1.20	23.50	21.00	18.00	215.00	116.73	13.46	3.36
BH-45A	1.20	25.00	22.50	19.50	228.33	128.44	13.94	3.49
BH-45A	1.20	26.50	24.00	21.00	268.96	140.81	14.41	3.60
BH-45A	1.20	28.00	25.50	22.50	283.24	153.18	14.88	3.72
BH-45A	1.20	29.50	27.00	24.00	297.52	165.55	14.88	3.72
BH-45A	1.20	30.00	27.50	24.50	302.28	169.67	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α_i)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.02	22	-	4.00	7.59	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.29	0.02	22	-	4.00	7.59	1.00	-	4.75	5.50	16.41	21.88	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.29	0.02	22	-	4.00	7.59	1.00	-	6.25	7.00	27.35	32.82	5.65	5.96	30.25	36.21	14.48	12.75
4	7.00	8.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	38.29	43.76	5.65	9.48	59.01	74.45	29.78	17.78
5	8.50	10.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	9.25	10.00	49.23	54.70	5.65	12.19	72.52	100.15	40.06	23.57
6	10.00	11.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	10.75	11.50	61.24	67.79	5.65	15.17	89.65	132.45	52.98	30.19
7	11.50	13.00	1.50	Granular	8.72	0.07	29	-	17.60	20.13	1.00	-	12.25	13.00	74.33	80.87	5.65	21.35	195.21	259.36	103.74	38.55
8	13.00	14.50	1.50	Granular	8.72	0.07	29	-	17.60	20.13	1.00	-	13.75	14.50	87.41	93.96	5.65	25.11	225.11	314.37	125.75	47.95
9	14.50	16.00	1.50	Granular	8.72	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	100.50	107.04	5.65	28.87	255.00	373.13	149.25	58.41
10	16.00	17.50	1.50	Granular	8.72	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	113.58	120.13	5.65	32.63	284.90	435.65	174.26	69.92
11	17.50	19.00	1.50	Granular	8.72	0.02	28	-	15.70	17.82	1.00	-	18.25	19.00	120.13	120.13	5.65	33.32	252.24	436.31	174.52	81.62
12	19.00	20.50	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	19.75	20.50	120.13	120.13	5.65	33.32	253.49	470.88	188.35	93.33
13	20.50	22.00	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	21.25	22.00	120.13	120.13	5.65	33.32	253.49	504.19	201.68	105.03
14	22.00	23.50	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	22.75	23.50	120.13	120.13	5.65	33.32	253.49	537.51	215.00	116.73
15	23.50	25.00	1.50	Granular	9.89	0.02	28	-	15.70	17.82	1.00	-	24.25	25.00	120.13	120.13	5.65	33.32	253.49	570.83	228.33	128.44
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	120.13	120.13	5.65	35.70	319.38	672.41	268.96	140.81
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	120.13	120.13	5.65	35.70	319.38	708.10	283.24	153.18
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	120.13	120.13	5.65	35.70	319.38	743.80	297.52	165.55
19	29.50	30.00	0.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	120.13	120.13	1.88	11.90	319.38	755.70	302.28	169.67

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
5	27.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-46	-
Chainage	5+122	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	93.96	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-46	1.00	20.50	18.00	16.50	137.39	70.01	10.40	2.60
BH-46	1.00	22.00	19.50	18.00	146.70	78.17	10.73	2.68
BH-46	1.00	23.50	21.00	19.50	156.01	86.34	11.06	2.77
BH-46	1.00	25.00	22.50	21.00	165.31	94.50	11.38	2.85
BH-46	1.00	26.50	24.00	22.50	174.62	102.67	11.70	2.93
BH-46	1.00	28.00	25.50	24.00	183.93	110.83	11.70	2.93
BH-46	1.00	29.50	27.00	25.50	193.23	118.99	12.01	3.00
BH-46	1.00	31.00	28.50	27.00	202.54	127.16	12.01	3.00
BH-46	1.00	32.50	30.00	28.50	211.85	135.32	12.32	3.08
BH-46	1.00	34.00	31.50	30.00	221.15	143.48	12.32	3.08
BH-46	1.00	35.00	32.50	31.00	227.36	148.93	12.32	3.08

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	4.71	3.39	21.64	25.02	10.01	7.00
3	5.50	7.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	27.35	32.82	4.71	5.64	31.02	40.05	16.02	10.23
4	7.00	8.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	38.29	43.76	4.71	7.90	40.40	57.33	22.93	14.09
5	8.50	10.00	1.50	Granular	7.29	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	49.23	54.70	4.71	10.57	60.30	87.80	35.12	18.69
6	10.00	11.50	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	61.24	67.79	4.71	13.14	74.58	115.22	46.09	24.02
7	11.50	13.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	74.33	80.87	4.71	17.18	118.96	176.78	70.71	30.48
8	13.00	14.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	87.41	93.96	4.71	20.20	137.34	215.36	86.14	37.79
9	14.50	16.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	93.96	93.96	4.71	22.49	156.07	256.58	102.63	45.74
10	16.00	17.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	93.96	93.96	4.71	22.49	156.07	279.07	111.63	53.68
11	17.50	19.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	93.96	93.96	4.71	23.27	173.95	320.22	128.09	61.85
12	19.00	20.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	93.96	93.96	4.71	23.27	173.95	343.49	137.39	70.01
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	93.96	93.96	4.71	23.27	173.95	366.75	146.70	78.17
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	93.96	93.96	4.71	23.27	173.95	390.02	156.01	86.34
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	93.96	93.96	4.71	23.27	173.95	413.28	165.31	94.50
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	93.96	93.96	4.71	23.27	173.95	436.55	174.62	102.67
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	93.96	93.96	4.71	23.27	173.95	459.81	183.93	110.83
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	93.96	93.96	4.71	23.27	173.95	483.08	193.23	118.99
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	93.96	93.96	4.71	23.27	173.95	506.35	202.54	127.16
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	93.96	93.96	4.71	23.27	173.95	529.61	211.85	135.32
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	93.96	93.96	4.71	23.27	173.95	552.88	221.15	143.48
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	93.96	93.96	3.14	15.51	173.95	568.39	227.36	148.93

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
2	22.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
3	23.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
4	25.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
5	26.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
6	28.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
7	29.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	31.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	32.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	34.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	35.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-46	-
Chainage	5+122	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	124.27	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-46	1.20	20.50	18.00	16.50	224.03	96.90	13.53	3.38
BH-46	1.20	22.00	19.50	18.00	238.81	109.62	13.97	3.49
BH-46	1.20	23.50	21.00	19.50	253.58	122.33	14.39	3.60
BH-46	1.20	25.00	22.50	21.00	268.35	135.05	14.81	3.70
BH-46	1.20	26.50	24.00	22.50	283.12	147.76	15.22	3.81
BH-46	1.20	28.00	25.50	24.00	297.89	160.48	15.22	3.81
BH-46	1.20	29.50	27.00	25.50	312.66	173.19	15.63	3.91
BH-46	1.20	31.00	28.50	27.00	327.43	185.90	15.63	3.91
BH-46	1.20	32.50	30.00	28.50	342.20	198.62	16.03	4.01
BH-46	1.20	34.00	31.50	30.00	356.97	211.33	16.03	4.01
BH-46	1.20	35.00	32.50	31.00	366.82	219.81	16.03	4.01

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	5.65	4.06	31.99	36.05	14.42	9.85
3	5.50	7.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	27.35	32.82	5.65	6.77	45.50	56.33	22.53	14.12
4	7.00	8.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	38.29	43.76	5.65	9.48	59.01	79.33	31.73	19.15
5	8.50	10.00	1.50	Granular	7.29	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	49.23	54.70	5.65	12.68	87.82	120.81	48.32	25.07
6	10.00	11.50	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	61.24	67.79	5.65	15.77	108.57	157.34	62.93	31.86
7	11.50	13.00	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	74.33	80.87	5.65	20.61	172.86	242.25	96.90	40.01
8	13.00	14.50	1.50	Granular	8.72	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	87.41	93.96	5.65	24.24	199.32	292.95	117.18	49.17
9	14.50	16.00	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	101.53	109.11	5.65	29.17	261.39	384.18	153.67	59.72
10	16.00	17.50	1.50	Granular	10.10	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	116.69	124.27	5.65	33.52	296.01	452.32	180.93	71.48
11	17.50	19.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	124.27	124.27	5.65	36.93	329.93	523.16	209.26	84.19
12	19.00	20.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	124.27	124.27	5.65	36.93	329.93	560.09	224.03	96.90
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	124.27	124.27	5.65	36.93	329.93	597.01	238.81	109.62
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	124.27	124.27	5.65	36.93	329.93	633.94	253.58	122.33
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	124.27	124.27	5.65	36.93	329.93	670.87	268.35	135.05
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	124.27	124.27	5.65	36.93	329.93	707.79	283.12	147.76
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	124.27	124.27	5.65	36.93	329.93	744.72	297.89	160.48
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	124.27	124.27	5.65	36.93	329.93	781.64	312.66	173.19
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	124.27	124.27	5.65	36.93	329.93	818.57	327.43	185.90
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	124.27	124.27	5.65	36.93	329.93	855.49	342.20	198.62
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	124.27	124.27	5.65	36.93	329.93	892.42	356.97	211.33
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	124.27	124.27	3.77	24.62	329.93	917.04	366.82	219.81

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
2	22.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
3	23.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
4	25.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
5	26.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
6	28.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
7	29.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	31.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	32.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	34.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	35.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-48	-
Chainage	5+393	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	101.80	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-48	1.00	20.50	18.00	18.00	140.53	73.72	12.12	3.03
BH-48	1.00	22.00	19.50	19.50	158.33	82.43	12.12	3.03
BH-48	1.00	23.50	21.00	21.00	168.42	91.14	12.39	3.10
BH-48	1.00	25.00	22.50	22.50	178.50	99.85	12.39	3.10
BH-48	1.00	26.50	24.00	24.00	188.58	108.56	12.65	3.16
BH-48	1.00	28.00	25.50	25.50	198.67	117.26	12.65	3.16
BH-48	1.00	29.50	27.00	27.00	208.75	125.97	12.65	3.16
BH-48	1.00	31.00	28.50	28.50	218.83	134.68	12.65	3.16
BH-48	1.00	32.50	30.00	30.00	228.92	143.39	12.91	3.23
BH-48	1.00	34.00	31.50	31.50	239.00	152.09	12.91	3.23
BH-48	1.00	35.00	32.50	32.50	245.72	157.90	12.91	3.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.24	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	6.18	12.37	4.71	1.17	10.41	11.59	4.63	4.73
2	4.00	5.50	1.50	Granular	8.24	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	18.55	24.73	4.71	3.52	18.88	23.57	9.43	7.36
3	5.50	7.00	1.50	Granular	8.24	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	30.91	37.10	4.71	6.63	42.44	53.77	21.51	10.87
4	7.00	8.50	1.50	Granular	8.24	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	43.28	49.46	4.71	9.29	55.30	75.91	30.37	15.12
5	8.50	10.00	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	56.00	62.55	4.71	12.02	69.13	101.76	40.71	20.13
6	10.00	11.50	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	69.09	75.63	4.71	14.83	82.73	130.20	52.08	25.93
7	11.50	13.00	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	12.25	13.00	82.17	88.72	4.71	18.31	113.16	178.94	71.57	32.71
8	13.00	14.50	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	13.75	14.50	95.26	101.80	4.71	21.23	129.15	216.16	86.46	40.31
9	14.50	16.00	1.50	Granular	10.10	0.07	27	-	13.80	15.50	1.00	-	15.25	16.00	101.80	101.80	4.71	22.69	129.90	239.60	95.84	48.31
10	16.00	17.50	1.50	Granular	10.10	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	101.80	101.80	4.71	24.37	168.52	302.58	121.03	56.78
11	17.50	19.00	1.50	Granular	10.10	0.10	29	-	17.60	20.13	1.00	-	18.25	19.00	101.80	101.80	4.71	24.37	168.52	326.95	130.78	65.25
12	19.00	20.50	1.50	Granular	10.10	0.10	29	-	17.60	20.13	1.00	-	19.75	20.50	101.80	101.80	4.71	24.37	168.52	351.32	140.53	73.72
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	101.80	101.80	4.71	25.21	187.83	395.83	158.33	82.43
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	101.80	101.80	4.71	25.21	187.83	421.04	168.42	91.14
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	101.80	101.80	4.71	25.21	187.83	446.25	178.50	99.85
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	101.80	101.80	4.71	25.21	187.83	471.46	188.58	108.56
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	101.80	101.80	4.71	25.21	187.83	496.67	198.67	117.26
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	101.80	101.80	4.71	25.21	187.83	521.88	208.75	125.97
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	101.80	101.80	4.71	25.21	187.83	547.09	218.83	134.68
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	101.80	101.80	4.71	25.21	187.83	572.29	228.92	143.39
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	101.80	101.80	4.71	25.21	187.83	597.50	239.00	152.09
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	101.80	101.80	3.14	16.81	187.83	614.31	245.72	157.90

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	32.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	34.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	35.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-48	-
Chainage	5+393	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.11	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-48	1.20	20.50	18.00	18.00	223.70	101.15	15.86	3.96
BH-48	1.20	22.00	19.50	19.50	253.80	114.52	15.86	3.96
BH-48	1.20	23.50	21.00	21.00	269.50	127.88	16.20	4.05
BH-48	1.20	25.00	22.50	22.50	285.20	141.25	16.20	4.05
BH-48	1.20	26.50	24.00	24.00	300.91	154.62	16.54	4.14
BH-48	1.20	28.00	25.50	25.50	316.61	167.99	16.54	4.14
BH-48	1.20	29.50	27.00	27.00	332.31	181.35	16.54	4.14
BH-48	1.20	31.00	28.50	28.50	348.01	194.72	16.54	4.14
BH-48	1.20	32.50	30.00	30.00	363.72	208.09	16.88	4.22
BH-48	1.20	34.00	31.50	31.50	379.42	221.45	16.88	4.22
BH-48	1.20	35.00	32.50	32.50	389.89	230.37	16.88	4.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.24	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	6.18	12.37	5.65	1.41	15.56	16.96	6.79	6.73
2	4.00	5.50	1.50	Granular	8.24	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	18.55	24.73	5.65	4.23	27.74	33.38	13.35	10.29
3	5.50	7.00	1.50	Granular	8.24	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	30.91	37.10	5.65	7.96	62.22	75.82	30.33	14.89
4	7.00	8.50	1.50	Granular	8.24	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	43.28	49.46	5.65	11.15	80.74	105.48	42.19	20.39
5	8.50	10.00	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	56.00	62.55	5.65	14.42	100.72	139.88	55.95	26.80
6	10.00	11.50	1.50	Granular	8.72	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	69.09	75.63	5.65	17.79	120.31	177.27	70.91	34.16
7	11.50	13.00	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	12.25	13.00	82.17	88.72	5.65	21.98	164.32	243.25	97.30	42.68
8	13.00	14.50	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	13.75	14.50	95.26	101.80	5.65	25.48	187.34	291.75	116.70	52.19
9	14.50	16.00	1.50	Granular	10.10	0.07	27	-	13.80	15.50	1.00	-	15.25	16.00	109.38	116.96	5.65	29.25	215.31	348.97	139.59	62.76
10	16.00	17.50	1.50	Granular	10.10	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	124.53	132.11	5.65	35.77	313.93	483.36	193.34	75.15
11	17.50	19.00	1.50	Granular	10.10	0.10	29	-	17.60	20.13	1.00	-	18.25	19.00	132.11	132.11	5.65	37.95	313.93	521.31	208.52	88.15
12	19.00	20.50	1.50	Granular	10.10	0.10	29	-	17.60	20.13	1.00	-	19.75	20.50	132.11	132.11	5.65	37.95	313.93	559.26	223.70	101.15
13	20.50	22.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	132.11	132.11	5.65	39.26	349.91	634.49	253.80	114.52
14	22.00	23.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	132.11	132.11	5.65	39.26	349.91	673.75	269.50	127.88
15	23.50	25.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	132.11	132.11	5.65	39.26	349.91	713.01	285.20	141.25
16	25.00	26.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	132.11	132.11	5.65	39.26	349.91	752.26	300.91	154.62
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	132.11	132.11	5.65	39.26	349.91	791.52	316.61	167.99
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	132.11	132.11	5.65	39.26	349.91	830.78	332.31	181.35
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	132.11	132.11	5.65	39.26	349.91	870.03	348.01	194.72
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	132.11	132.11	5.65	39.26	349.91	909.29	363.72	208.09
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	132.11	132.11	5.65	39.26	349.91	948.55	379.42	221.45
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	132.11	132.11	3.77	26.17	349.91	974.72	389.89	230.37

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	32.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	34.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	35.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-49	-
Chainage	5+442	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	100.39	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-49	1.00	20.50	18.00	18.00	139.99	73.97	10.74	2.68
BH-49	1.00	22.00	19.50	19.50	149.60	82.35	11.02	2.76
BH-49	1.00	23.50	21.00	21.00	159.21	90.73	11.58	2.89
BH-49	1.00	25.00	22.50	22.50	168.76	99.11	11.58	2.89
BH-49	1.00	26.50	24.00	24.00	178.38	107.48	11.85	2.96
BH-49	1.00	28.00	25.50	25.50	187.99	115.86	11.85	2.96
BH-49	1.00	29.50	27.00	27.00	205.61	124.47	11.85	2.96
BH-49	1.00	31.00	28.50	28.50	215.56	133.08	11.85	2.96
BH-49	1.00	32.50	30.00	30.00	225.50	141.69	12.12	3.03
BH-49	1.00	34.00	31.50	31.50	235.44	150.30	12.12	3.03
BH-49	1.00	35.00	32.50	32.50	242.07	156.04	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	4.71	1.13	12.26	13.39	5.35	4.71
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	4.71	3.39	21.64	26.15	10.46	7.31
3	5.50	7.00	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	28.42	34.97	4.71	5.87	33.42	43.80	17.52	10.60
4	7.00	8.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	41.51	48.05	4.71	8.57	44.65	63.59	25.44	14.65
5	8.50	10.00	1.50	Granular	8.72	0.05	28	-	15.70	17.82	1.00	-	9.25	10.00	54.59	61.14	4.71	12.62	91.25	122.81	49.13	19.83
6	10.00	11.50	1.50	Granular	8.72	0.05	28	-	15.70	17.82	1.00	-	10.75	11.50	67.68	74.22	4.71	15.64	109.63	156.83	62.73	25.86
7	11.50	13.00	1.50	Granular	8.72	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	80.76	87.31	4.71	18.67	128.00	193.87	77.55	32.74
8	13.00	14.50	1.50	Granular	8.72	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	93.85	100.39	4.71	21.69	146.38	233.94	93.57	40.46
9	14.50	16.00	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	100.39	100.39	4.71	24.03	166.28	277.87	111.15	48.84
10	16.00	17.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	100.39	100.39	4.71	24.03	166.28	301.90	120.76	57.22
11	17.50	19.00	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	100.39	100.39	4.71	24.03	166.28	325.93	130.37	65.59
12	19.00	20.50	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	100.39	100.39	4.71	24.03	166.28	349.97	139.99	73.97
13	20.50	22.00	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	21.25	22.00	100.39	100.39	4.71	24.03	166.28	374.00	149.60	82.35
14	22.00	23.50	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	22.75	23.50	100.39	100.39	4.71	24.03	166.28	398.03	159.21	90.73
15	23.50	25.00	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	24.25	25.00	100.39	100.39	4.71	24.03	166.14	421.91	168.76	99.11
16	25.00	26.50	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	25.75	26.50	100.39	100.39	4.71	24.03	166.14	445.94	178.38	107.48
17	26.50	28.00	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	27.25	28.00	100.39	100.39	4.71	24.03	166.14	469.97	187.99	115.86
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	100.39	100.39	4.71	24.86	185.33	514.03	205.61	124.47
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	100.39	100.39	4.71	24.86	185.33	538.89	215.56	133.08
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	100.39	100.39	4.71	24.86	185.33	563.75	225.50	141.69
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	100.39	100.39	4.71	24.86	185.33	588.61	235.44	150.30
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	100.39	100.39	3.14	16.57	185.33	605.18	242.07	156.04

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
2	22.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
3	23.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-49	-
Chainage	5+442	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	130.70	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-49	1.20	20.50	18.00	18.00	222.90	101.49	14.06	3.51
BH-49	1.20	22.00	19.50	19.50	237.92	114.38	14.43	3.61
BH-49	1.20	23.50	21.00	21.00	252.93	127.26	15.15	3.79
BH-49	1.20	25.00	22.50	22.50	267.85	140.15	15.15	3.79
BH-49	1.20	26.50	24.00	24.00	282.87	153.04	15.51	3.88
BH-49	1.20	28.00	25.50	25.50	297.89	165.93	15.51	3.88
BH-49	1.20	29.50	27.00	27.00	327.76	179.18	15.51	3.88
BH-49	1.20	31.00	28.50	28.50	343.30	192.43	15.51	3.88
BH-49	1.20	32.50	30.00	30.00	358.84	205.68	15.86	3.96
BH-49	1.20	34.00	31.50	31.50	374.37	218.93	15.86	3.96
BH-49	1.20	35.00	32.50	32.50	384.73	227.76	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	5.65	1.35	18.48	19.83	7.93	6.71
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	5.65	4.06	31.99	37.41	14.96	10.23
3	5.50	7.00	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	28.42	34.97	5.65	7.04	49.12	61.58	24.63	14.57
4	7.00	8.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	41.51	48.05	5.65	10.28	65.28	88.01	35.21	19.82
5	8.50	10.00	1.50	Granular	8.72	0.05	28	-	15.70	17.82	1.00	-	9.25	10.00	54.59	61.14	5.65	15.14	132.95	170.83	68.33	26.44
6	10.00	11.50	1.50	Granular	8.72	0.05	28	-	15.70	17.82	1.00	-	10.75	11.50	67.68	74.22	5.65	18.77	159.41	216.06	86.42	34.07
7	11.50	13.00	1.50	Granular	8.72	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	80.76	87.31	5.65	22.40	185.88	264.92	105.97	42.72
8	13.00	14.50	1.50	Granular	8.72	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	93.85	100.39	5.65	26.03	212.34	317.41	126.96	52.38
9	14.50	16.00	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	107.97	115.55	5.65	31.01	276.09	412.17	164.87	63.44
10	16.00	17.50	1.50	Granular	10.10	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	123.12	130.70	5.65	35.37	310.71	482.16	192.87	75.72
11	17.50	19.00	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	18.25	19.00	130.70	130.70	5.65	37.54	310.71	519.71	207.88	88.60
12	19.00	20.50	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	19.75	20.50	130.70	130.70	5.65	37.54	310.71	557.25	222.90	101.49
13	20.50	22.00	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	21.25	22.00	130.70	130.70	5.65	37.54	310.71	594.79	237.92	114.38
14	22.00	23.50	1.50	Granular	10.10	0.05	29	-	17.60	20.13	1.00	-	22.75	23.50	130.70	130.70	5.65	37.54	310.71	632.34	252.93	127.26
15	23.50	25.00	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	24.25	25.00	130.70	130.70	5.65	37.54	310.46	669.63	267.85	140.15
16	25.00	26.50	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	25.75	26.50	130.70	130.70	5.65	37.54	310.46	707.17	282.87	153.04
17	26.50	28.00	1.50	Granular	9.89	0.05	29	-	17.60	20.13	1.00	-	27.25	28.00	130.70	130.70	5.65	37.54	310.46	744.72	297.89	165.93
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	130.70	130.70	5.65	38.84	346.32	819.41	327.76	179.18
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	130.70	130.70	5.65	38.84	346.32	858.25	343.30	192.43
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	130.70	130.70	5.65	38.84	346.32	897.09	358.84	205.68
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	130.70	130.70	5.65	38.84	346.32	935.93	374.37	218.93
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	130.70	130.70	3.77	25.89	346.32	961.82	384.73	227.76

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_s/T Ratio	L_s/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
2	22.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
3	23.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-50	-
Chainage	5+532	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.39	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-50	1.00	20.50	18.00	16.50	123.57	72.50	11.70	2.93
BH-50	1.00	22.00	19.50	18.00	140.79	80.77	12.01	3.00
BH-50	1.00	23.50	21.00	19.50	150.26	89.05	12.32	3.08
BH-50	1.00	25.00	22.50	21.00	159.72	97.32	12.63	3.16
BH-50	1.00	26.50	24.00	22.50	169.19	105.60	12.63	3.16
BH-50	1.00	28.00	25.50	24.00	194.92	114.35	12.93	3.23
BH-50	1.00	29.50	27.00	25.50	205.06	123.10	12.93	3.23
BH-50	1.00	31.00	28.50	27.00	215.20	131.84	12.93	3.23
BH-50	1.00	32.50	30.00	28.50	225.34	140.59	13.23	3.31
BH-50	1.00	34.00	31.50	30.00	235.48	149.34	13.23	3.31
BH-50	1.00	35.00	32.50	31.00	242.24	155.17	13.23	3.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	4.71	3.39	21.64	25.02	10.01	7.00
3	5.50	7.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	27.35	32.82	4.71	5.64	31.02	40.05	16.02	10.23
4	7.00	8.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	39.36	45.91	4.71	8.12	42.81	59.96	23.98	14.15
5	8.50	10.00	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	52.45	58.99	4.71	11.69	76.83	105.68	42.27	19.07
6	10.00	11.50	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	65.53	72.08	4.71	14.60	92.82	136.27	54.51	24.81
7	11.50	13.00	1.50	Granular	10.10	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	79.65	87.23	4.71	18.41	128.75	190.61	76.24	31.61
8	13.00	14.50	1.50	Granular	10.10	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	94.81	102.39	4.71	21.91	150.03	233.80	93.52	39.40
9	14.50	16.00	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	102.39	102.39	4.71	24.51	169.45	277.72	111.09	47.91
10	16.00	17.50	1.50	Granular	9.89	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	102.39	102.39	4.71	24.51	169.30	302.09	120.83	56.42
11	17.50	19.00	1.50	Granular	9.89	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	102.39	102.39	4.71	22.82	130.50	286.10	114.44	64.46
12	19.00	20.50	1.50	Granular	9.89	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	102.39	102.39	4.71	22.82	130.50	308.92	123.57	72.50
13	20.50	22.00	1.50	Granular	9.89	0.06	28	-	15.70	17.82	1.00	-	21.25	22.00	102.39	102.39	4.71	23.66	149.90	351.99	140.79	80.77
14	22.00	23.50	1.50	Granular	9.89	0.06	28	-	15.70	17.82	1.00	-	22.75	23.50	102.39	102.39	4.71	23.66	149.90	375.65	150.26	89.05
15	23.50	25.00	1.50	Granular	9.89	0.12	28	-	15.70	17.82	1.00	-	24.25	25.00	102.39	102.39	4.71	23.66	149.90	399.31	159.72	97.32
16	25.00	26.50	1.50	Granular	9.89	0.12	28	-	15.70	17.82	1.00	-	25.75	26.50	102.39	102.39	4.71	23.66	149.90	422.98	169.19	105.60
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	102.39	102.39	4.71	25.35	188.86	487.29	194.92	114.35
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	102.39	102.39	4.71	25.35	188.86	512.64	205.06	123.10
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	102.39	102.39	4.71	25.35	188.86	538.00	215.20	131.84
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	102.39	102.39	4.71	25.35	188.86	563.35	225.34	140.59
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	102.39	102.39	4.71	25.35	188.86	588.70	235.48	149.34
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	102.39	102.39	3.14	16.90	188.86	605.60	242.24	155.17

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
2	22.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32
5	26.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-50	-
Chainage	5+532	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.38	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-50	1.20	20.50	18.00	16.50	192.43	99.33	15.22	3.81
BH-50	1.20	22.00	19.50	18.00	221.52	111.98	15.63	3.91
BH-50	1.20	23.50	21.00	19.50	236.21	124.64	16.03	4.01
BH-50	1.20	25.00	22.50	21.00	250.89	137.29	16.43	4.11
BH-50	1.20	26.50	24.00	22.50	265.58	149.95	16.43	4.11
BH-50	1.20	28.00	25.50	24.00	310.24	163.34	16.82	4.20
BH-50	1.20	29.50	27.00	25.50	325.98	176.73	16.82	4.20
BH-50	1.20	31.00	28.50	27.00	341.71	190.12	16.82	4.20
BH-50	1.20	32.50	30.00	28.50	357.45	203.50	17.20	4.30
BH-50	1.20	34.00	31.50	30.00	373.18	216.89	17.20	4.30
BH-50	1.20	35.00	32.50	31.00	383.67	225.82	17.20	4.30

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	16.41	21.88	5.65	4.06	31.99	36.05	14.42	9.85
3	5.50	7.00	1.50	Granular	7.29	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	27.35	32.82	5.65	6.77	45.50	56.33	22.53	14.12
4	7.00	8.50	1.50	Granular	8.72	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	39.36	45.91	5.65	9.75	62.63	83.21	33.29	19.22
5	8.50	10.00	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	52.45	58.99	5.65	14.03	112.01	146.62	58.65	25.52
6	10.00	11.50	1.50	Granular	8.72	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	65.53	72.08	5.65	17.53	135.03	187.17	74.87	32.81
7	11.50	13.00	1.50	Granular	10.10	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	79.65	87.23	5.65	22.09	187.20	261.43	104.57	41.37
8	13.00	14.50	1.50	Granular	10.10	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	94.81	102.39	5.65	26.29	217.85	318.37	127.35	51.10
9	14.50	16.00	1.50	Granular	10.10	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	109.96	117.54	5.65	31.59	280.64	412.75	165.10	62.32
10	16.00	17.50	1.50	Granular	9.89	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	124.96	132.38	5.65	35.89	314.30	482.30	192.92	74.75
11	17.50	19.00	1.50	Granular	9.89	0.10	27	-	13.80	15.50	1.00	-	18.25	19.00	132.38	132.38	5.65	35.40	242.26	445.66	178.27	87.04
12	19.00	20.50	1.50	Granular	9.89	0.10	27	-	13.80	15.50	1.00	-	19.75	20.50	132.38	132.38	5.65	35.40	242.26	481.07	192.43	99.33
13	20.50	22.00	1.50	Granular	9.89	0.06	28	-	15.70	17.82	1.00	-	21.25	22.00	132.38	132.38	5.65	36.71	278.28	553.80	221.52	111.98
14	22.00	23.50	1.50	Granular	9.89	0.06	28	-	15.70	17.82	1.00	-	22.75	23.50	132.38	132.38	5.65	36.71	278.28	590.52	236.21	124.64
15	23.50	25.00	1.50	Granular	9.89	0.12	28	-	15.70	17.82	1.00	-	24.25	25.00	132.38	132.38	5.65	36.71	278.28	627.23	250.89	137.29
16	25.00	26.50	1.50	Granular	9.89	0.12	28	-	15.70	17.82	1.00	-	25.75	26.50	132.38	132.38	5.65	36.71	278.28	663.95	265.58	149.95
17	26.50	28.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	132.38	132.38	5.65	39.34	350.60	775.60	310.24	163.34
18	28.00	29.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	132.38	132.38	5.65	39.34	350.60	814.94	325.98	176.73
19	29.50	31.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	132.38	132.38	5.65	39.34	350.60	854.28	341.71	190.12
20	31.00	32.50	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	132.38	132.38	5.65	39.34	350.60	893.61	357.45	203.50
21	32.50	34.00	1.50	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	132.38	132.38	5.65	39.34	350.60	932.95	373.18	216.89
22	34.00	35.00	1.00	Granular	10.10	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	132.38	132.38	3.77	26.22	350.60	959.18	383.67	225.82

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_y/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
2	22.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43
5	26.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61

A.7. Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-51	1.00	20.50	18.00	16.50	278.71	132.06	9.71	2.43	142.09	76.92	9.71	2.43
BH-51	1.00	22.00	19.50	18.00	298.09	147.50	10.06	2.51	151.96	85.69	10.06	2.51
BH-51	1.00	23.50	21.00	19.50	317.79	162.94	10.06	2.51	162.14	94.46	10.06	2.51
BH-51	1.00	25.00	22.50	21.00	337.49	178.37	10.40	2.60	172.31	103.24	10.40	2.60
BH-51	1.00	26.50	24.00	22.50	390.69	194.80	10.73	2.68	200.30	112.52	10.73	2.68
BH-51	1.00	28.00	25.50	24.00	411.79	211.22	11.06	2.77	211.20	121.80	11.06	2.77
BH-51	1.00	29.50	27.00	25.50	432.89	227.64	11.06	2.77	222.11	131.09	11.06	2.77
BH-51	1.00	31.00	28.50	27.00	454.00	244.06	11.38	2.85	233.01	140.37	11.38	2.85
BH-51	1.00	32.50	30.00	28.50	475.10	260.48	11.38	2.85	243.92	149.65	11.38	2.85
BH-51	1.00	34.00	31.50	30.00	496.21	276.91	11.70	2.93	254.82	158.94	11.70	2.93
BH-51	1.00	35.00	32.50	31.00	510.28	287.86	11.70	2.93	262.09	165.12	11.70	2.93
BH-51	1.20	20.50	18.00	16.50	400.35	171.30	12.64	3.16	222.53	105.12	12.64	3.16
BH-51	1.20	22.00	19.50	18.00	426.90	192.64	13.09	3.27	237.66	118.47	13.09	3.27
BH-51	1.20	23.50	21.00	19.50	454.00	213.98	13.09	3.27	253.33	131.82	13.09	3.27
BH-51	1.20	25.00	22.50	21.00	481.10	235.32	13.53	3.38	269.00	145.16	13.53	3.38
BH-51	1.20	26.50	24.00	22.50	563.18	258.02	13.97	3.49	317.23	159.29	13.97	3.49
BH-51	1.20	28.00	25.50	24.00	592.21	280.72	14.39	3.60	334.02	173.42	14.39	3.60
BH-51	1.20	29.50	27.00	25.50	621.24	303.42	14.39	3.60	350.82	187.55	14.39	3.60
BH-51	1.20	31.00	28.50	27.00	650.28	326.11	14.81	3.70	367.61	201.68	14.81	3.70

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-51	1.20	32.50	30.00	28.50	679.31	348.81	14.81	3.70	384.40	215.81	14.81	3.70
BH-51	1.20	34.00	31.50	30.00	708.34	371.51	15.22	3.81	401.19	229.94	15.22	3.81
BH-51	1.20	35.00	32.50	31.00	727.69	386.64	15.22	3.81	412.39	239.36	15.22	3.81
BH-52	1.00	20.50	18.00	18.00	297.84	134.00	11.02	2.76	152.65	78.11	11.02	2.76
BH-52	1.00	22.00	19.50	19.50	318.31	149.98	11.30	2.83	163.25	87.18	11.30	2.83
BH-52	1.00	23.50	21.00	21.00	338.77	165.95	11.30	2.83	173.86	96.26	11.30	2.83
BH-52	1.00	25.00	22.50	22.50	375.84	182.42	11.58	2.89	193.23	105.59	11.58	2.89
BH-52	1.00	26.50	24.00	24.00	397.01	198.89	11.58	2.89	204.20	114.92	11.58	2.89
BH-52	1.00	28.00	25.50	25.50	418.19	215.36	11.85	2.96	215.17	124.25	11.85	2.96
BH-52	1.00	29.50	27.00	27.00	439.36	231.83	11.85	2.96	226.14	133.58	11.85	2.96
BH-52	1.00	31.00	28.50	28.50	460.53	248.30	11.85	2.96	237.11	142.91	11.85	2.96
BH-52	1.00	32.50	30.00	30.00	481.70	264.77	12.12	3.03	248.09	152.24	12.12	3.03
BH-52	1.00	34.00	31.50	31.50	502.87	281.24	12.12	3.03	259.06	161.56	12.12	3.03
BH-52	1.00	35.00	32.50	32.50	516.98	292.22	12.12	3.03	266.37	167.78	12.12	3.03
BH-52	1.20	20.50	18.00	18.00	431.90	173.95	14.43	3.61	241.99	106.88	14.43	3.61
BH-52	1.20	22.00	19.50	19.50	460.15	196.10	14.79	3.70	258.40	120.75	14.79	3.70
BH-52	1.20	23.50	21.00	21.00	488.39	218.24	14.79	3.70	274.82	134.61	14.79	3.70
BH-52	1.20	25.00	22.50	22.50	543.97	241.07	15.15	3.79	307.34	148.87	15.15	3.79
BH-52	1.20	26.50	24.00	24.00	573.19	263.90	15.15	3.79	324.32	163.13	15.15	3.79
BH-52	1.20	28.00	25.50	25.50	602.40	286.73	15.51	3.88	341.30	177.39	15.51	3.88
BH-52	1.20	29.50	27.00	27.00	631.62	309.56	15.51	3.88	358.28	191.65	15.51	3.88
BH-52	1.20	31.00	28.50	28.50	660.84	332.39	15.51	3.88	375.26	205.91	15.51	3.88
BH-52	1.20	32.50	30.00	30.00	690.06	355.21	15.86	3.96	392.24	220.17	15.86	3.96
BH-52	1.20	34.00	31.50	31.50	719.28	378.04	15.86	3.96	409.22	234.44	15.86	3.96
BH-52	1.20	35.00	32.50	32.50	738.76	393.26	15.86	3.96	420.54	243.94	15.86	3.96

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-53	1.00	20.50	18.00	18.00	257.03	129.69	9.25	2.31	128.50	74.96	9.25	2.31
BH-53	1.00	22.00	19.50	19.50	307.89	145.28	9.25	2.31	154.49	83.64	9.25	2.31
BH-53	1.00	23.50	21.00	21.00	327.79	160.86	9.25	2.31	164.53	92.32	9.25	2.31
BH-53	1.00	25.00	22.50	22.50	347.70	176.44	9.56	2.39	174.58	101.00	9.56	2.39
BH-53	1.00	26.50	24.00	24.00	367.61	192.03	9.86	2.46	184.63	109.69	9.86	2.46
BH-53	1.00	28.00	25.50	25.50	403.68	208.09	10.16	2.54	202.99	118.61	10.16	2.54
BH-53	1.00	29.50	27.00	27.00	424.27	224.16	10.16	2.54	213.39	127.54	10.16	2.54
BH-53	1.00	31.00	28.50	28.50	444.86	240.22	10.45	2.61	223.78	136.46	10.45	2.61
BH-53	1.00	32.50	30.00	30.00	465.46	256.29	10.45	2.61	234.17	145.39	10.45	2.61
BH-53	1.00	34.00	31.50	31.50	486.05	272.35	10.74	2.68	244.57	154.31	10.74	2.68
BH-53	1.00	35.00	32.50	32.50	499.78	283.06	10.74	2.68	251.50	160.26	10.74	2.68
BH-53	1.20	20.50	18.00	18.00	363.45	167.56	12.11	3.03	197.13	101.88	12.11	3.03
BH-53	1.20	22.00	19.50	19.50	441.36	188.95	12.11	3.03	241.59	114.99	12.11	3.03
BH-53	1.20	23.50	21.00	21.00	468.52	210.34	12.11	3.03	256.93	128.09	12.11	3.03
BH-53	1.20	25.00	22.50	22.50	495.69	231.73	12.52	3.13	272.26	141.20	12.52	3.13
BH-53	1.20	26.50	24.00	24.00	522.85	253.12	12.91	3.23	287.60	154.31	12.91	3.23
BH-53	1.20	28.00	25.50	25.50	576.33	275.17	13.30	3.32	318.02	167.79	13.30	3.32
BH-53	1.20	29.50	27.00	27.00	604.43	297.22	13.30	3.32	333.88	181.27	13.30	3.32
BH-53	1.20	31.00	28.50	28.50	632.53	319.26	13.68	3.42	349.75	194.75	13.68	3.42
BH-53	1.20	32.50	30.00	30.00	660.63	341.31	13.68	3.42	365.61	208.23	13.68	3.42
BH-53	1.20	34.00	31.50	31.50	688.74	363.36	14.06	3.51	381.47	221.71	14.06	3.51
BH-53	1.20	35.00	32.50	32.50	707.47	378.06	14.06	3.51	392.05	230.70	14.06	3.51
BH-54	1.00	22.00	19.50	19.50	305.36	140.29	9.56	2.39	162.48	83.99	9.56	2.39
BH-54	1.00	23.50	21.00	21.00	324.43	155.29	9.86	2.46	172.81	92.87	9.86	2.46
BH-54	1.00	25.00	22.50	22.50	343.50	170.29	10.16	2.54	183.14	101.75	10.16	2.54

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-54	1.00	26.50	24.00	24.00	362.56	185.29	10.45	2.61	193.46	110.63	10.45	2.61
BH-54	1.00	28.00	25.50	25.50	381.63	200.28	10.45	2.61	203.79	119.50	10.45	2.61
BH-54	1.00	29.50	27.00	27.00	400.70	215.28	10.74	2.68	214.12	128.38	10.74	2.68
BH-54	1.00	30.00	27.50	27.50	407.06	220.28	10.74	2.68	217.56	131.34	10.74	2.68
BH-54	1.20	22.00	19.50	19.50	448.15	184.39	12.52	3.13	261.72	116.83	12.52	3.13
BH-54	1.20	23.50	21.00	21.00	474.85	205.45	12.91	3.23	277.92	130.55	12.91	3.23
BH-54	1.20	25.00	22.50	22.50	501.55	226.51	13.30	3.32	294.13	144.27	13.30	3.32
BH-54	1.20	26.50	24.00	24.00	528.24	247.57	13.68	3.42	310.34	157.98	13.68	3.42
BH-54	1.20	28.00	25.50	25.50	554.94	268.64	13.68	3.42	326.54	171.70	13.68	3.42
BH-54	1.20	29.50	27.00	27.00	581.64	289.70	14.06	3.51	342.75	185.42	14.06	3.51
BH-54	1.20	30.00	27.50	27.50	590.53	296.72	14.06	3.51	348.15	190.00	14.06	3.51
BH-55	1.00	22.00	19.50	18.00	313.08	143.67	10.73	2.68	169.19	86.66	10.73	2.68
BH-55	1.00	23.50	21.00	19.50	332.56	158.95	11.06	2.77	179.92	95.82	11.06	2.77
BH-55	1.00	25.00	22.50	21.00	352.03	174.24	11.38	2.85	190.66	104.98	11.38	2.85
BH-55	1.00	26.50	24.00	22.50	371.51	189.52	11.38	2.85	201.39	114.15	11.38	2.85
BH-55	1.00	28.00	25.50	24.00	390.98	204.80	11.70	2.93	212.12	123.31	11.70	2.93
BH-55	1.00	29.50	27.00	25.50	410.46	220.08	12.01	3.00	222.85	132.47	12.01	3.00
BH-55	1.00	30.00	27.50	26.00	416.95	225.18	12.01	3.00	226.43	135.52	12.01	3.00
BH-55	1.20	22.00	19.50	18.00	458.38	188.62	13.97	3.49	270.72	120.21	13.97	3.49
BH-55	1.20	23.50	21.00	19.50	485.56	210.03	14.39	3.60	287.41	134.27	14.39	3.60
BH-55	1.20	25.00	22.50	21.00	512.74	231.43	14.81	3.70	304.10	148.32	14.81	3.70
BH-55	1.20	26.50	24.00	22.50	539.93	252.83	14.81	3.70	320.79	162.38	14.81	3.70
BH-55	1.20	28.00	25.50	24.00	567.11	274.24	15.22	3.81	337.49	176.44	15.22	3.81
BH-55	1.20	29.50	27.00	25.50	594.29	295.64	15.63	3.91	354.18	190.50	15.63	3.91
BH-55	1.20	30.00	27.50	26.00	603.35	302.77	15.63	3.91	359.74	195.19	15.63	3.91

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-56	1.00	22.00	19.50	16.50	257.70	129.90	10.73	2.68	131.78	76.46	10.73	2.68
BH-56	1.00	23.50	21.00	18.00	275.05	143.56	10.73	2.68	140.97	84.41	10.73	2.68
BH-56	1.00	25.00	22.50	19.50	321.13	158.08	11.10	2.77	165.43	92.80	11.10	2.77
BH-56	1.00	26.50	24.00	21.00	339.51	172.59	11.10	2.77	175.07	101.20	11.10	2.77
BH-56	1.00	28.00	25.50	22.50	357.64	187.11	11.45	2.86	184.46	109.59	11.45	2.86
BH-56	1.00	29.50	27.00	24.00	376.02	201.62	11.80	2.95	194.10	117.99	11.80	2.95
BH-56	1.00	30.00	27.50	24.50	382.15	206.46	11.80	2.95	197.31	120.79	11.80	2.95
BH-56	1.20	22.00	19.50	16.50	298.09	152.70	13.94	3.49	245.98	116.23	13.94	3.49
BH-56	1.20	23.50	21.00	18.00	315.64	167.12	13.94	3.49	263.53	130.65	13.94	3.49
BH-56	1.20	25.00	22.50	19.50	367.75	182.40	14.41	3.60	315.64	145.93	14.41	3.60
BH-56	1.20	26.50	24.00	21.00	386.19	197.69	14.41	3.60	334.08	161.21	14.41	3.60
BH-56	1.20	28.00	25.50	22.50	404.20	212.97	14.88	3.72	352.09	176.49	14.88	3.72
BH-56	1.20	29.50	27.00	24.00	422.64	228.25	15.33	3.83	370.53	191.78	15.33	3.83
BH-56	1.20	30.00	27.50	24.50	428.78	233.34	15.33	3.83	376.68	196.87	15.33	3.83
BH-57	1.00	20.50	18.00	18.00	283.84	129.22	10.45	2.61	156.73	79.45	10.45	2.61
BH-57	1.00	22.00	19.50	19.50	303.23	144.44	11.02	2.76	167.66	88.75	11.02	2.76
BH-57	1.00	23.50	21.00	21.00	338.36	160.13	11.30	2.83	187.62	98.32	11.30	2.83
BH-57	1.00	25.00	22.50	22.50	358.41	175.81	11.58	2.89	198.93	107.88	11.58	2.89
BH-57	1.00	26.50	24.00	24.00	378.47	191.50	11.85	2.96	210.24	117.45	11.85	2.96
BH-57	1.00	28.00	25.50	25.50	398.52	207.18	12.12	3.03	221.55	127.02	12.12	3.03
BH-57	1.00	29.50	27.00	27.00	418.57	222.87	12.12	3.03	232.86	136.59	12.12	3.03
BH-57	1.00	31.00	28.50	28.50	438.62	238.56	12.39	3.10	244.17	146.15	12.39	3.10
BH-57	1.00	32.50	30.00	30.00	458.68	254.24	12.39	3.10	255.48	155.72	12.39	3.10
BH-57	1.00	34.00	31.50	31.50	478.73	269.93	12.39	3.10	266.79	165.29	12.39	3.10
BH-57	1.00	35.00	32.50	32.50	492.10	280.39	12.39	3.10	274.33	171.66	12.39	3.10

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-57	1.20	20.50	18.00	18.00	413.39	168.22	13.68	3.42	247.41	108.49	13.68	3.42
BH-57	1.20	22.00	19.50	19.50	440.34	189.45	14.43	3.61	264.21	122.63	14.43	3.61
BH-57	1.20	23.50	21.00	21.00	493.38	211.34	14.79	3.70	297.51	137.17	14.79	3.70
BH-57	1.20	25.00	22.50	22.50	521.26	233.23	15.15	3.79	314.89	151.72	15.15	3.79
BH-57	1.20	26.50	24.00	24.00	549.14	255.12	15.51	3.88	332.28	166.26	15.51	3.88
BH-57	1.20	28.00	25.50	25.50	577.01	277.01	15.86	3.96	349.67	180.81	15.86	3.96
BH-57	1.20	29.50	27.00	27.00	604.89	298.90	15.86	3.96	367.05	195.35	15.86	3.96
BH-57	1.20	31.00	28.50	28.50	632.77	320.79	16.20	4.05	384.44	209.90	16.20	4.05
BH-57	1.20	32.50	30.00	30.00	660.64	342.67	16.20	4.05	401.82	224.44	16.20	4.05
BH-57	1.20	34.00	31.50	31.50	688.52	364.56	16.20	4.05	419.21	238.99	16.20	4.05
BH-57	1.20	35.00	32.50	32.50	707.11	379.16	16.20	4.05	430.80	248.69	16.20	4.05
BH-58	1.00	20.50	18.00	18.00	265.73	127.27	10.45	2.61	146.50	78.52	10.45	2.61
BH-58	1.00	22.00	19.50	19.50	284.44	142.01	11.30	2.83	157.05	87.55	11.30	2.83
BH-58	1.00	23.50	21.00	21.00	303.14	156.76	11.58	2.89	167.60	96.58	11.58	2.89
BH-58	1.00	25.00	22.50	22.50	353.28	172.44	11.58	2.89	196.13	106.14	11.58	2.89
BH-58	1.00	26.50	24.00	24.00	373.57	188.12	11.85	2.96	207.68	115.70	11.85	2.96
BH-58	1.00	28.00	25.50	25.50	393.62	203.80	11.85	2.96	218.98	125.26	11.85	2.96
BH-58	1.00	29.50	27.00	27.00	413.66	219.48	12.12	3.03	230.28	134.82	12.12	3.03
BH-58	1.00	31.00	28.50	28.50	433.70	235.16	12.12	3.03	241.58	144.38	12.12	3.03
BH-58	1.00	32.50	30.00	30.00	453.75	250.84	12.12	3.03	252.88	153.94	12.12	3.03
BH-58	1.00	34.00	31.50	31.50	473.79	266.52	12.12	3.03	264.19	163.51	12.12	3.03
BH-58	1.00	35.00	32.50	32.50	487.16	276.97	12.12	3.03	271.72	169.88	12.12	3.03
BH-58	1.20	20.50	18.00	18.00	378.48	164.36	13.68	3.42	223.51	105.85	13.68	3.42
BH-58	1.20	22.00	19.50	19.50	403.96	184.57	14.79	3.70	239.21	119.21	14.79	3.70
BH-58	1.20	23.50	21.00	21.00	429.45	204.79	15.15	3.79	254.90	132.57	15.15	3.79

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-58	1.20	25.00	22.50	22.50	506.01	226.28	15.15	3.79	302.44	146.72	15.15	3.79
BH-58	1.20	26.50	24.00	24.00	533.74	247.76	15.51	3.88	319.68	160.87	15.51	3.88
BH-58	1.20	28.00	25.50	25.50	561.05	269.25	15.51	3.88	336.50	175.01	15.51	3.88
BH-58	1.20	29.50	27.00	27.00	588.35	290.74	15.86	3.96	353.31	189.16	15.86	3.96
BH-58	1.20	31.00	28.50	28.50	615.66	312.23	15.86	3.96	370.13	203.30	15.86	3.96
BH-58	1.20	32.50	30.00	30.00	642.96	333.72	15.86	3.96	386.94	217.45	15.86	3.96
BH-58	1.20	34.00	31.50	31.50	670.27	355.21	15.86	3.96	403.76	231.60	15.86	3.96
BH-58	1.20	35.00	32.50	32.50	688.48	369.54	15.86	3.96	414.97	241.03	15.86	3.96
BH-59	1.00	20.50	18.00	18.00	285.28	130.38	11.58	2.89	156.90	79.72	11.58	2.89
BH-59	1.00	22.00	19.50	19.50	304.63	145.57	12.12	3.03	167.80	89.00	12.12	3.03
BH-59	1.00	23.50	21.00	21.00	323.98	160.77	12.39	3.10	178.70	98.28	12.39	3.10
BH-59	1.00	25.00	22.50	22.50	359.05	176.43	12.39	3.10	198.60	107.82	12.39	3.10
BH-59	1.00	26.50	24.00	24.00	379.07	192.09	12.39	3.10	209.87	117.37	12.39	3.10
BH-59	1.00	28.00	25.50	25.50	399.09	207.76	12.65	3.16	221.15	126.91	12.65	3.16
BH-59	1.00	29.50	27.00	27.00	419.11	223.42	12.65	3.16	232.43	136.45	12.65	3.16
BH-59	1.00	31.00	28.50	28.50	439.13	239.08	12.65	3.16	243.70	145.99	12.65	3.16
BH-59	1.00	32.50	30.00	30.00	459.15	254.74	12.65	3.16	254.98	155.54	12.65	3.16
BH-59	1.00	34.00	31.50	31.50	479.17	270.41	12.65	3.16	266.26	165.08	12.65	3.16
BH-59	1.00	35.00	32.50	32.50	492.51	280.85	12.65	3.16	273.77	171.44	12.65	3.16
BH-59	1.20	20.50	18.00	18.00	414.93	169.51	15.15	3.79	247.43	108.73	15.15	3.79
BH-59	1.20	22.00	19.50	19.50	441.84	190.72	15.86	3.96	264.20	122.84	15.86	3.96
BH-59	1.20	23.50	21.00	21.00	468.74	211.94	16.20	4.05	280.97	136.95	16.20	4.05
BH-59	1.20	25.00	22.50	22.50	521.72	233.80	16.20	4.05	314.18	151.47	16.20	4.05
BH-59	1.20	26.50	24.00	24.00	549.55	255.66	16.20	4.05	331.53	165.98	16.20	4.05
BH-59	1.20	28.00	25.50	25.50	577.39	277.52	16.54	4.14	348.87	180.50	16.54	4.14

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-59	1.20	29.50	27.00	27.00	605.22	299.37	16.54	4.14	366.22	195.02	16.54	4.14
BH-59	1.20	31.00	28.50	28.50	633.06	321.23	16.54	4.14	383.56	209.53	16.54	4.14
BH-59	1.20	32.50	30.00	30.00	660.89	343.09	16.54	4.14	400.91	224.05	16.54	4.14
BH-59	1.20	34.00	31.50	31.50	688.73	364.95	16.54	4.14	418.25	238.57	16.54	4.14
BH-59	1.20	35.00	32.50	32.50	707.29	379.53	16.54	4.14	429.82	248.24	16.54	4.14
BH-60	1.00	20.50	18.00	18.00	278.43	127.09	10.74	2.68	151.70	77.59	10.74	2.68
BH-60	1.00	22.00	19.50	19.50	297.46	142.06	11.02	2.76	162.28	86.64	11.02	2.76
BH-60	1.00	23.50	21.00	21.00	331.94	157.48	11.30	2.83	181.59	95.95	11.30	2.83
BH-60	1.00	25.00	22.50	22.50	351.63	172.91	11.30	2.83	192.53	105.26	11.30	2.83
BH-60	1.00	26.50	24.00	24.00	371.31	188.34	11.58	2.89	203.47	114.56	11.58	2.89
BH-60	1.00	28.00	25.50	25.50	390.99	203.77	11.58	2.89	214.41	123.87	11.58	2.89
BH-60	1.00	29.50	27.00	27.00	410.68	219.19	11.85	2.96	225.35	133.18	11.85	2.96
BH-60	1.00	31.00	28.50	28.50	430.36	234.62	11.85	2.96	236.29	142.49	11.85	2.96
BH-60	1.00	32.50	30.00	30.00	450.04	250.05	11.85	2.96	247.24	151.80	11.85	2.96
BH-60	1.00	34.00	31.50	31.50	469.73	265.48	11.85	2.96	258.18	161.10	11.85	2.96
BH-60	1.00	35.00	32.50	32.50	482.85	275.76	11.85	2.96	265.47	167.31	11.85	2.96
BH-60	1.20	20.50	18.00	18.00	406.19	165.57	14.06	3.51	240.68	106.17	14.06	3.51
BH-60	1.20	22.00	19.50	19.50	432.71	186.51	14.43	3.61	257.06	120.01	14.43	3.61
BH-60	1.20	23.50	21.00	21.00	484.92	208.08	14.79	3.70	289.51	134.24	14.79	3.70
BH-60	1.20	25.00	22.50	22.50	512.36	229.66	14.79	3.70	306.46	148.48	14.79	3.70
BH-60	1.20	26.50	24.00	24.00	539.79	251.24	15.15	3.79	323.40	162.71	15.15	3.79
BH-60	1.20	28.00	25.50	25.50	567.22	272.82	15.15	3.79	340.34	176.94	15.15	3.79
BH-60	1.20	29.50	27.00	27.00	594.66	294.40	15.51	3.88	357.28	191.18	15.51	3.88
BH-60	1.20	31.00	28.50	28.50	622.09	315.97	15.51	3.88	374.22	205.41	15.51	3.88
BH-60	1.20	32.50	30.00	30.00	649.52	337.55	15.51	3.88	391.17	219.65	15.51	3.88

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-60	1.20	34.00	31.50	31.50	676.95	359.13	15.51	3.88	408.11	233.88	15.51	3.88
BH-60	1.20	35.00	32.50	32.50	695.24	373.51	15.51	3.88	419.40	243.37	15.51	3.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-51	-
Chainage	5+596	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	213.07	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-51	1.00	20.50	18.00	16.50	278.71	132.06	9.71	2.43
BH-51	1.00	22.00	19.50	18.00	298.09	147.50	10.06	2.51
BH-51	1.00	23.50	21.00	19.50	317.79	162.94	10.06	2.51
BH-51	1.00	25.00	22.50	21.00	337.49	178.37	10.40	2.60
BH-51	1.00	26.50	24.00	22.50	390.69	194.80	10.73	2.68
BH-51	1.00	28.00	25.50	24.00	411.79	211.22	11.06	2.77
BH-51	1.00	29.50	27.00	25.50	432.89	227.64	11.06	2.77
BH-51	1.00	31.00	28.50	27.00	454.00	244.06	11.38	2.85
BH-51	1.00	32.50	30.00	28.50	475.10	260.48	11.38	2.85
BH-51	1.00	34.00	31.50	30.00	496.21	276.91	11.70	2.93
BH-51	1.00	35.00	32.50	31.00	510.28	287.86	11.70	2.93

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.25	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	13.69	27.38	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	18.25	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	41.06	54.75	4.71	8.13	47.97	56.10	22.44	8.33
3	5.50	7.00	1.50	Granular	18.25	0.04	24	-	8.00	9.78	1.00	-	6.25	7.00	68.44	82.13	4.71	13.56	69.08	90.77	36.31	13.77
4	7.00	8.50	1.50	Granular	18.25	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	95.81	109.50	4.71	20.56	122.42	164.67	65.87	21.18
5	8.50	10.00	1.50	Granular	18.25	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	123.19	136.88	4.71	26.44	150.89	219.58	87.83	30.23
6	10.00	11.50	1.50	Granular	20.20	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	152.03	167.18	4.71	33.88	215.28	317.86	127.14	41.37
7	11.50	13.00	1.50	Granular	20.20	0.05	27	-	13.80	15.50	1.00	-	12.25	13.00	182.33	197.48	4.71	40.63	252.31	395.52	158.21	54.39
8	13.00	14.50	1.50	Granular	10.39	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	205.27	213.07	4.71	47.44	305.64	496.29	198.52	69.33
9	14.50	16.00	1.50	Granular	10.39	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	213.07	213.07	4.71	49.24	305.64	545.53	218.21	84.76
10	16.00	17.50	1.50	Granular	10.39	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	213.07	213.07	4.71	51.00	345.25	636.14	254.46	100.69
11	17.50	19.00	1.50	Granular	10.39	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	213.07	213.07	4.71	51.00	345.25	687.14	274.86	116.62
12	19.00	20.50	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	213.07	213.07	4.71	49.24	305.64	696.78	278.71	132.06
13	20.50	22.00	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	213.07	213.07	4.71	49.24	304.85	745.24	298.09	147.50
14	22.00	23.50	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	213.07	213.07	4.71	49.24	304.85	794.48	317.79	162.94
15	23.50	25.00	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	24.25	25.00	213.07	213.07	4.71	49.24	304.85	843.72	337.49	178.37
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	213.07	213.07	4.71	52.76	385.08	976.72	390.69	194.80
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	213.07	213.07	4.71	52.76	385.08	1029.48	411.79	211.22
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	213.07	213.07	4.71	52.76	385.08	1082.24	432.89	227.64
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	213.07	213.07	4.71	52.76	385.08	1135.00	454.00	244.06
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	213.07	213.07	4.71	52.76	385.08	1187.76	475.10	260.48
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	213.07	213.07	4.71	52.76	385.08	1240.52	496.21	276.91
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	213.07	213.07	3.14	35.17	385.08	1275.69	510.28	287.86

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.50	0.206	0.824	9.71	2.43	34.55	15.79	23.30	5.83	82.92	37.90
2	22.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
3	23.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
4	25.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
5	26.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
6	28.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
7	29.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
7	31.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
7	32.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
7	34.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
7	35.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-51	-
Chainage	5+596	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	244.25	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-51	1.20	20.50	18.00	16.50	400.35	171.30	12.64	3.16
BH-51	1.20	22.00	19.50	18.00	426.90	192.64	13.09	3.27
BH-51	1.20	23.50	21.00	19.50	454.00	213.98	13.09	3.27
BH-51	1.20	25.00	22.50	21.00	481.10	235.32	13.53	3.38
BH-51	1.20	26.50	24.00	22.50	563.18	258.02	13.97	3.49
BH-51	1.20	28.00	25.50	24.00	592.21	280.72	14.39	3.60
BH-51	1.20	29.50	27.00	25.50	621.24	303.42	14.39	3.60
BH-51	1.20	31.00	28.50	27.00	650.28	326.11	14.81	3.70
BH-51	1.20	32.50	30.00	28.50	679.31	348.81	14.81	3.70
BH-51	1.20	34.00	31.50	30.00	708.34	371.51	15.22	3.81
BH-51	1.20	35.00	32.50	31.00	727.69	386.64	15.22	3.81

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.25	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	13.69	27.38	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	18.25	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	41.06	54.75	5.65	9.76	70.73	80.49	32.20	11.44
3	5.50	7.00	1.50	Granular	18.25	0.04	24	-	8.00	9.78	1.00	-	6.25	7.00	68.44	82.13	5.65	16.27	101.13	127.16	50.86	18.37
4	7.00	8.50	1.50	Granular	18.25	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	95.81	109.50	5.65	24.67	178.75	229.46	91.78	27.66
5	8.50	10.00	1.50	Granular	18.25	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	123.19	136.88	5.65	31.72	219.74	302.17	120.87	38.91
6	10.00	11.50	1.50	Granular	20.20	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	152.03	167.18	5.65	40.66	313.17	436.26	174.50	52.67
7	11.50	13.00	1.50	Granular	20.20	0.05	27	-	13.80	15.50	1.00	-	12.25	13.00	182.33	197.48	5.65	48.76	366.50	538.34	215.34	68.70
8	13.00	14.50	1.50	Granular	10.39	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	205.27	213.07	5.65	56.93	441.97	670.75	268.30	87.02
9	14.50	16.00	1.50	Granular	10.39	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	220.86	228.66	5.65	61.25	473.50	763.53	305.41	106.54
10	16.00	17.50	1.50	Granular	10.39	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	236.45	244.25	5.65	67.92	570.46	928.42	371.37	127.94
11	17.50	19.00	1.50	Granular	10.39	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	244.25	244.25	5.65	70.16	570.46	998.58	399.43	149.96
12	19.00	20.50	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	244.25	244.25	5.65	67.74	505.02	1000.88	400.35	171.30
13	20.50	22.00	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	244.25	244.25	5.65	67.74	503.67	1067.26	426.90	192.64
14	22.00	23.50	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	244.25	244.25	5.65	67.74	503.67	1135.00	454.00	213.98
15	23.50	25.00	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	24.25	25.00	244.25	244.25	5.65	67.74	503.67	1202.74	481.10	235.32
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	244.25	244.25	5.65	72.58	636.30	1407.95	563.18	258.02
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	244.25	244.25	5.65	72.58	636.30	1480.53	592.21	280.72
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	244.25	244.25	5.65	72.58	636.30	1553.11	621.24	303.42
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	244.25	244.25	5.65	72.58	636.30	1625.69	650.28	326.11
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	244.25	244.25	5.65	72.58	636.30	1698.27	679.31	348.81
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	244.25	244.25	5.65	72.58	636.30	1770.85	708.34	371.51
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	244.25	244.25	3.77	48.39	636.30	1819.23	727.69	386.64

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.64	3.16	52.53	23.86	30.34	7.58	126.06	57.27
2	22.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
3	23.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
4	25.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
5	26.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
6	28.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
7	29.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
7	31.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
7	32.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
7	34.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
7	35.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-52	-
Chainage	5+718	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	213.74	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-52	1.00	20.50	18.00	18.00	297.84	134.00	11.02	2.76
BH-52	1.00	22.00	19.50	19.50	318.31	149.98	11.30	2.83
BH-52	1.00	23.50	21.00	21.00	338.77	165.95	11.30	2.83
BH-52	1.00	25.00	22.50	22.50	375.84	182.42	11.58	2.89
BH-52	1.00	26.50	24.00	24.00	397.01	198.89	11.58	2.89
BH-52	1.00	28.00	25.50	25.50	418.19	215.36	11.85	2.96
BH-52	1.00	29.50	27.00	27.00	439.36	231.83	11.85	2.96
BH-52	1.00	31.00	28.50	28.50	460.53	248.30	11.85	2.96
BH-52	1.00	32.50	30.00	30.00	481.70	264.77	12.12	3.03
BH-52	1.00	34.00	31.50	31.50	502.87	281.24	12.12	3.03
BH-52	1.00	35.00	32.50	32.50	516.98	292.22	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{su})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.25	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.69	27.38	4.71	2.49	19.25	21.73	8.69	5.09
2	4.00	5.50	1.50	Granular	18.25	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	41.06	54.75	4.71	7.46	35.61	45.56	18.22	8.83
3	5.50	7.00	1.50	Granular	18.70	0.06	25	-	10.00	10.88	1.00	-	6.25	7.00	68.78	82.80	4.71	14.19	78.38	102.51	41.01	14.45
4	7.00	8.50	1.50	Granular	18.70	0.06	25	-	10.00	10.88	1.00	-	7.75	8.50	96.83	110.85	4.71	19.98	102.43	146.55	58.62	21.70
5	8.50	10.00	1.50	Granular	18.70	0.09	26	-	11.90	13.19	1.00	-	9.25	10.00	124.88	138.90	4.71	26.80	153.20	224.12	89.65	30.85
6	10.00	11.50	1.50	Granular	18.70	0.09	26	-	11.90	13.19	1.00	-	10.75	11.50	152.93	166.95	4.71	32.82	182.37	286.10	114.44	41.69
7	11.50	13.00	1.50	Granular	20.50	0.06	28	-	15.70	17.82	1.00	-	12.25	13.00	182.33	197.70	4.71	42.14	290.32	436.19	174.48	55.14
8	13.00	14.50	1.50	Granular	10.69	0.06	28	-	15.70	17.82	1.00	-	13.75	14.50	205.72	213.74	4.71	47.55	306.77	500.19	200.08	70.10
9	14.50	16.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	213.74	213.74	4.71	51.16	346.52	591.11	236.44	86.08
10	16.00	17.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	213.74	213.74	4.71	51.16	346.52	642.27	256.91	102.05
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	213.74	213.74	4.71	51.16	346.52	693.43	277.37	118.03
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	213.74	213.74	4.71	51.16	346.52	744.60	297.84	134.00
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	213.74	213.74	4.71	51.16	346.52	795.76	318.31	149.98
14	22.00	23.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	213.74	213.74	4.71	51.16	346.52	846.93	338.77	165.95
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	213.74	213.74	4.71	52.93	386.28	939.61	375.84	182.42
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	213.74	213.74	4.71	52.93	386.28	992.53	397.01	198.89
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	213.74	213.74	4.71	52.93	386.28	1045.46	418.19	215.36
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	213.74	213.74	4.71	52.93	386.28	1098.39	439.36	231.83
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	213.74	213.74	4.71	52.93	386.28	1151.32	460.53	248.30
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	213.74	213.74	4.71	52.93	386.28	1204.25	481.70	264.77
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	213.74	213.74	4.71	52.93	386.28	1257.18	502.87	281.24
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	213.74	213.74	3.14	35.29	386.28	1292.46	516.98	292.22

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
2	22.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-52	-
Chainage	5+718	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	245.82	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-52	1.20	20.50	18.00	18.00	431.90	173.95	14.43	3.61
BH-52	1.20	22.00	19.50	19.50	460.15	196.10	14.79	3.70
BH-52	1.20	23.50	21.00	21.00	488.39	218.24	14.79	3.70
BH-52	1.20	25.00	22.50	22.50	543.97	241.07	15.15	3.79
BH-52	1.20	26.50	24.00	24.00	573.19	263.90	15.15	3.79
BH-52	1.20	28.00	25.50	25.50	602.40	286.73	15.51	3.88
BH-52	1.20	29.50	27.00	27.00	631.62	309.56	15.51	3.88
BH-52	1.20	31.00	28.50	28.50	660.84	332.39	15.51	3.88
BH-52	1.20	32.50	30.00	30.00	690.06	355.21	15.86	3.96
BH-52	1.20	34.00	31.50	31.50	719.28	378.04	15.86	3.96
BH-52	1.20	35.00	32.50	32.50	738.76	393.26	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.25	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.69	27.38	5.65	2.98	28.54	31.53	12.61	7.17
2	4.00	5.50	1.50	Granular	18.25	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	41.06	54.75	5.65	8.95	52.11	64.04	25.62	12.05
3	5.50	7.00	1.50	Granular	18.70	0.06	25	-	10.00	10.88	1.00	-	6.25	7.00	68.78	82.80	5.65	17.03	114.99	143.95	57.58	19.19
4	7.00	8.50	1.50	Granular	18.70	0.06	25	-	10.00	10.88	1.00	-	7.75	8.50	96.83	110.85	5.65	23.98	149.63	202.57	81.03	28.28
5	8.50	10.00	1.50	Granular	18.70	0.09	26	-	11.90	13.19	1.00	-	9.25	10.00	124.88	138.90	5.65	32.16	223.14	308.23	123.29	39.66
6	10.00	11.50	1.50	Granular	18.70	0.09	26	-	11.90	13.19	1.00	-	10.75	11.50	152.93	166.95	5.65	39.38	265.14	389.62	155.85	53.06
7	11.50	13.00	1.50	Granular	20.50	0.06	28	-	15.70	17.82	1.00	-	12.25	13.00	182.33	197.70	5.65	50.57	421.71	596.75	238.70	69.60
8	13.00	14.50	1.50	Granular	10.69	0.06	28	-	15.70	17.82	1.00	-	13.75	14.50	205.72	213.74	5.65	57.06	443.66	675.76	270.30	87.95
9	14.50	16.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	221.76	229.78	5.65	63.70	537.78	833.58	333.43	108.16
10	16.00	17.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	237.80	245.82	5.65	68.31	574.42	938.53	375.41	129.66
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	245.82	245.82	5.65	70.61	574.42	1009.14	403.66	151.81
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	245.82	245.82	5.65	70.61	574.42	1079.76	431.90	173.95
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	245.82	245.82	5.65	70.61	574.42	1150.37	460.15	196.10
14	22.00	23.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	245.82	245.82	5.65	70.61	574.42	1220.98	488.39	218.24
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	245.82	245.82	5.65	73.05	640.31	1359.92	543.97	241.07
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	245.82	245.82	5.65	73.05	640.31	1432.96	573.19	263.90
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	245.82	245.82	5.65	73.05	640.31	1506.01	602.40	286.73
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	245.82	245.82	5.65	73.05	640.31	1579.06	631.62	309.56
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	245.82	245.82	5.65	73.05	640.31	1652.10	660.84	332.39
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	245.82	245.82	5.65	73.05	640.31	1725.15	690.06	355.21
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	245.82	245.82	5.65	73.05	640.31	1798.20	719.28	378.04
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	245.82	245.82	3.77	48.70	640.31	1846.89	738.76	393.26

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
2	22.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-53	-
Chainage	5+830	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	207.91	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	14.40	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-53	1.00	20.50	18.00	18.00	257.03	129.69	9.25	2.31
BH-53	1.00	22.00	19.50	19.50	307.89	145.28	9.25	2.31
BH-53	1.00	23.50	21.00	21.00	327.79	160.86	9.25	2.31
BH-53	1.00	25.00	22.50	22.50	347.70	176.44	9.56	2.39
BH-53	1.00	26.50	24.00	24.00	367.61	192.03	9.86	2.46
BH-53	1.00	28.00	25.50	25.50	403.68	208.09	10.16	2.54
BH-53	1.00	29.50	27.00	27.00	424.27	224.16	10.16	2.54
BH-53	1.00	31.00	28.50	28.50	444.86	240.22	10.45	2.61
BH-53	1.00	32.50	30.00	30.00	465.46	256.29	10.45	2.61
BH-53	1.00	34.00	31.50	31.50	486.05	272.35	10.74	2.68
BH-53	1.00	35.00	32.50	32.50	499.78	283.06	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.88	27.75	4.71	2.52	19.51	22.03	8.81	5.10
2	4.00	5.50	1.50	Granular	18.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	41.63	55.50	4.71	7.56	36.10	46.18	18.47	8.87
3	5.50	7.00	1.50	Granular	18.50	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	69.38	83.25	4.71	13.74	70.02	93.84	37.54	14.37
4	7.00	8.50	1.50	Granular	18.35	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	97.01	110.78	4.71	19.22	91.20	134.24	53.70	21.40
5	8.50	10.00	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	124.54	138.30	4.71	26.73	152.41	222.18	88.87	30.53
6	10.00	11.50	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	152.06	165.83	4.71	32.63	181.04	283.44	113.37	41.32
7	11.50	13.00	1.50	Granular	18.93	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	180.02	194.22	4.71	41.61	284.46	428.47	171.39	54.62
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	201.06	207.91	4.71	46.47	297.61	488.08	195.23	69.28
9	14.50	16.00	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	207.91	207.91	4.71	49.77	336.18	576.42	230.57	84.86
10	16.00	17.50	1.50	Granular	9.89	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	207.91	207.91	4.71	49.77	336.71	626.72	250.69	100.45
11	17.50	19.00	1.50	Granular	9.89	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	207.91	207.91	4.71	46.33	259.45	595.80	238.32	115.07
12	19.00	20.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	19.75	20.50	207.91	207.91	4.71	46.33	259.89	642.57	257.03	129.69
13	20.50	22.00	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	207.91	207.91	4.71	49.77	337.27	769.72	307.89	145.28
14	22.00	23.50	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	207.91	207.91	4.71	49.77	337.27	819.48	327.79	160.86
15	23.50	25.00	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	207.91	207.91	4.71	49.77	337.27	869.25	347.70	176.44
16	25.00	26.50	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	25.75	26.50	207.91	207.91	4.71	49.77	337.27	919.02	367.61	192.03
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	207.91	207.91	4.71	51.48	375.96	1009.19	403.68	208.09
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	207.91	207.91	4.71	51.48	375.96	1060.67	424.27	224.16
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	207.91	207.91	4.71	51.48	375.96	1112.16	444.86	240.22
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	207.91	207.91	4.71	51.48	375.96	1163.64	465.46	256.29
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	207.91	207.91	4.71	51.48	375.96	1215.12	486.05	272.35
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	207.91	207.91	3.14	34.32	375.96	1249.44	499.78	283.06

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
2	22.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
3	23.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
4	25.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	0.72	2.05	1.85	7.15	6.43	0.209	0.837	9.56	2.39	34.18	15.35	22.94	5.73	82.04	36.84
5	26.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
6	28.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
7	29.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
7	31.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
7	32.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
7	34.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	35.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-53	-
Chainage	5+830	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	236.43	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	14.40	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-53	1.20	20.50	18.00	18.00	363.45	167.56	12.11	3.03
BH-53	1.20	22.00	19.50	19.50	441.36	188.95	12.11	3.03
BH-53	1.20	23.50	21.00	21.00	468.52	210.34	12.11	3.03
BH-53	1.20	25.00	22.50	22.50	495.69	231.73	12.52	3.13
BH-53	1.20	26.50	24.00	24.00	522.85	253.12	12.91	3.23
BH-53	1.20	28.00	25.50	25.50	576.33	275.17	13.30	3.32
BH-53	1.20	29.50	27.00	27.00	604.43	297.22	13.30	3.32
BH-53	1.20	31.00	28.50	28.50	632.53	319.26	13.68	3.42
BH-53	1.20	32.50	30.00	30.00	660.63	341.31	13.68	3.42
BH-53	1.20	34.00	31.50	31.50	688.74	363.36	14.06	3.51
BH-53	1.20	35.00	32.50	32.50	707.47	378.06	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.88	27.75	5.65	3.02	28.93	31.96	12.78	7.18
2	4.00	5.50	1.50	Granular	18.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	41.63	55.50	5.65	9.07	52.83	64.92	25.97	12.09
3	5.50	7.00	1.50	Granular	18.50	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	69.38	83.25	5.65	16.49	102.51	131.10	52.44	19.09
4	7.00	8.50	1.50	Granular	18.35	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	97.01	110.78	5.65	23.06	132.99	184.64	73.86	27.92
5	8.50	10.00	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	124.54	138.30	5.65	32.07	221.95	305.68	122.27	39.28
6	10.00	11.50	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	152.06	165.83	5.65	39.16	263.17	386.05	154.42	52.62
7	11.50	13.00	1.50	Granular	18.93	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	180.02	194.22	5.65	49.93	412.99	585.80	234.32	68.97
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	201.06	207.91	5.65	55.76	430.18	658.75	263.50	86.96
9	14.50	16.00	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	214.75	221.59	5.65	61.69	517.18	807.44	322.98	106.61
10	16.00	17.50	1.50	Granular	9.89	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	229.01	236.43	5.65	65.78	552.01	908.05	363.22	127.40
11	17.50	19.00	1.50	Granular	9.89	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	236.43	236.43	5.65	63.23	425.36	844.63	337.85	147.48
12	19.00	20.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	19.75	20.50	236.43	236.43	5.65	63.23	426.11	908.62	363.45	167.56
13	20.50	22.00	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	236.43	236.43	5.65	67.91	552.97	1103.39	441.36	188.95
14	22.00	23.50	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	236.43	236.43	5.65	67.91	552.97	1171.30	468.52	210.34
15	23.50	25.00	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	236.43	236.43	5.65	67.91	552.97	1239.22	495.69	231.73
16	25.00	26.50	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	25.75	26.50	236.43	236.43	5.65	67.91	552.97	1307.13	522.85	253.12
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	236.43	236.43	5.65	70.26	616.40	1440.81	576.33	275.17
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	236.43	236.43	5.65	70.26	616.40	1511.07	604.43	297.22
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	236.43	236.43	5.65	70.26	616.40	1581.33	632.53	319.26
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	236.43	236.43	5.65	70.26	616.40	1651.58	660.63	341.31
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	236.43	236.43	5.65	70.26	616.40	1721.84	688.74	363.36
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	236.43	236.43	3.77	46.84	616.40	1768.68	707.47	378.06

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
2	22.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
3	23.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
4	25.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.62	2.07	1.85	8.34	7.45	0.160	0.639	12.52	3.13	52.18	23.32	30.04	7.51	125.23	55.97
5	26.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
6	28.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
7	29.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
7	31.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
7	32.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
7	34.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	35.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-54	-
Chainage	5+939	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	192.52	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.85	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-54	1.00	22.00	19.50	19.50	305.36	140.29	9.56	2.39
BH-54	1.00	23.50	21.00	21.00	324.43	155.29	9.86	2.46
BH-54	1.00	25.00	22.50	22.50	343.50	170.29	10.16	2.54
BH-54	1.00	26.50	24.00	24.00	362.56	185.29	10.45	2.61
BH-54	1.00	28.00	25.50	25.50	381.63	200.28	10.45	2.61
BH-54	1.00	29.50	27.00	27.00	400.70	215.28	10.74	2.68
BH-54	1.00	30.00	27.50	27.50	407.06	220.28	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	3.25	4.00	13.76	27.53	4.71	2.95	37.23	40.18	16.07	5.23
2	4.00	5.50	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	4.75	5.50	41.29	55.05	4.71	8.86	65.85	77.66	31.07	9.36
3	5.50	7.00	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	68.81	82.58	4.71	14.77	94.47	121.05	48.42	15.14
4	7.00	8.50	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	96.34	110.10	4.71	20.68	123.09	170.35	68.14	22.58
5	8.50	10.00	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	123.86	137.63	4.71	26.58	151.71	225.55	90.22	31.67
6	10.00	11.50	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	151.39	165.15	4.71	32.49	180.33	286.66	114.67	42.42
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	171.99	178.84	4.71	39.75	256.78	402.86	161.15	55.20
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	185.68	192.52	4.71	42.91	276.00	465.00	186.00	68.86
9	14.50	16.00	1.50	Granular	10.69	0.03	27	-	13.80	15.50	1.00	-	15.25	16.00	192.52	192.52	4.71	42.91	241.09	472.99	189.20	82.52
10	16.00	17.50	1.50	Granular	10.69	0.03	27	-	13.80	15.50	1.00	-	16.75	17.50	192.52	192.52	4.71	42.91	241.09	515.89	206.36	96.19
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	192.52	192.52	4.71	46.08	312.86	633.75	253.50	110.74
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	192.52	192.52	4.71	46.08	312.86	679.83	271.93	125.29
13	20.50	22.00	1.50	Granular	10.69	0.09	30	-	19.50	22.44	1.00	-	21.25	22.00	192.52	192.52	4.71	47.67	348.74	763.39	305.36	140.29
14	22.00	23.50	1.50	Granular	10.69	0.09	30	-	19.50	22.44	1.00	-	22.75	23.50	192.52	192.52	4.71	47.67	348.74	811.06	324.43	155.29
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	192.52	192.52	4.71	47.67	348.74	858.74	343.50	170.29
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	192.52	192.52	4.71	47.67	348.74	906.41	362.56	185.29
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	192.52	192.52	4.71	47.67	348.74	954.09	381.63	200.28
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	192.52	192.52	4.71	47.67	348.74	1001.76	400.70	215.28
19	29.50	30.00	0.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	192.52	192.52	1.57	15.89	348.74	1017.65	407.06	220.28

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	0.72	2.05	1.85	7.15	6.43	0.209	0.837	9.56	2.39	34.18	15.35	22.94	5.73	82.04	36.84
2	22.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
3	24.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-54	-
Chainage	5+939	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	224.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.85	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-54	1.20	22.00	19.50	19.50	448.15	184.39	12.52	3.13
BH-54	1.20	23.50	21.00	21.00	474.85	205.45	12.91	3.23
BH-54	1.20	25.00	22.50	22.50	501.55	226.51	13.30	3.32
BH-54	1.20	26.50	24.00	24.00	528.24	247.57	13.68	3.42
BH-54	1.20	28.00	25.50	25.50	554.94	268.64	13.68	3.42
BH-54	1.20	29.50	27.00	27.00	581.64	289.70	14.06	3.51
BH-54	1.20	30.00	27.50	27.50	590.53	296.72	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α_i)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	3.25	4.00	13.76	27.53	5.65	3.54	56.09	59.63	23.85	7.33
2	4.00	5.50	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	4.75	5.50	41.29	55.05	5.65	10.63	97.30	111.48	44.59	12.68
3	5.50	7.00	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	68.81	82.58	5.65	17.72	138.52	170.41	68.17	20.02
4	7.00	8.50	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	96.34	110.10	5.65	24.81	179.73	236.44	94.58	29.34
5	8.50	10.00	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	123.86	137.63	5.65	31.90	220.94	309.55	123.82	40.64
6	10.00	11.50	1.50	Granular	18.35	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	151.39	165.15	5.65	38.99	262.16	389.75	155.90	53.94
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	171.99	178.84	5.65	47.70	371.39	546.69	218.68	69.67
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	185.68	192.52	5.65	51.50	399.07	625.86	250.34	86.46
9	14.50	16.00	1.50	Granular	10.69	0.03	27	-	13.80	15.50	1.00	-	15.25	16.00	200.54	208.56	5.65	53.63	377.07	657.49	263.00	103.85
10	16.00	17.50	1.50	Granular	10.69	0.03	27	-	13.80	15.50	1.00	-	16.75	17.50	216.58	224.60	5.65	57.92	405.30	743.64	297.46	122.45
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	224.60	224.60	5.65	64.52	525.94	928.81	371.52	142.89
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	224.60	224.60	5.65	64.52	525.94	993.32	397.33	163.33
13	20.50	22.00	1.50	Granular	10.69	0.09	30	-	19.50	22.44	1.00	-	21.25	22.00	224.60	224.60	5.65	66.74	586.27	1120.39	448.15	184.39
14	22.00	23.50	1.50	Granular	10.69	0.09	30	-	19.50	22.44	1.00	-	22.75	23.50	224.60	224.60	5.65	66.74	586.27	1187.13	474.85	205.45
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	224.60	224.60	5.65	66.74	586.27	1253.87	501.55	226.51
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	224.60	224.60	5.65	66.74	586.27	1320.61	528.24	247.57
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	224.60	224.60	5.65	66.74	586.27	1387.35	554.94	268.64
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	224.60	224.60	5.65	66.74	586.27	1454.09	581.64	289.70
19	29.50	30.00	0.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	224.60	224.60	1.88	22.25	586.27	1476.34	590.53	296.72

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.62	2.07	1.85	8.34	7.45	0.160	0.639	12.52	3.13	52.18	23.32	30.04	7.51	125.23	55.97
2	22.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
3	24.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-55	-
Chainage	6+004	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	196.62	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-55	1.00	22.00	19.50	18.00	313.08	143.67	10.73	2.68
BH-55	1.00	23.50	21.00	19.50	332.56	158.95	11.06	2.77
BH-55	1.00	25.00	22.50	21.00	352.03	174.24	11.38	2.85
BH-55	1.00	26.50	24.00	22.50	371.51	189.52	11.38	2.85
BH-55	1.00	28.00	25.50	24.00	390.98	204.80	11.70	2.93
BH-55	1.00	29.50	27.00	25.50	410.46	220.08	12.01	3.00
BH-55	1.00	30.00	27.50	26.00	416.95	225.18	12.01	3.00

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.35	0.20	21	-	2.00	6.49	1.00	-	3.25	4.00	13.76	27.53	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	4.75	5.50	41.29	55.05	4.71	8.86	65.85	74.71	29.88	8.53
3	5.50	7.00	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	68.81	82.58	4.71	14.77	94.47	118.10	47.24	14.31
4	7.00	8.50	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	96.34	110.10	4.71	20.68	123.09	167.39	66.96	21.75
5	8.50	10.00	1.50	Granular	18.93	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	124.30	138.50	4.71	27.70	179.55	251.55	100.62	31.16
6	10.00	11.50	1.50	Granular	18.93	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	152.69	166.89	4.71	34.03	214.25	320.28	128.11	42.33
7	11.50	13.00	1.50	Granular	9.12	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	173.73	180.58	4.71	40.15	259.23	405.42	162.17	55.23
8	13.00	14.50	1.50	Granular	10.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	188.60	196.62	4.71	43.59	282.72	472.50	189.00	69.08
9	14.50	16.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	196.62	196.62	4.71	47.06	319.36	556.20	222.48	83.91
10	16.00	17.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	196.62	196.62	4.71	47.06	319.36	603.26	241.30	98.74
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	196.62	196.62	4.71	47.06	319.36	650.33	260.13	113.56
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	196.62	196.62	4.71	47.06	319.36	697.39	278.96	128.39
13	20.50	22.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	21.25	22.00	196.62	196.62	4.71	48.69	355.99	782.71	313.08	143.67
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	196.62	196.62	4.71	48.69	355.99	831.40	332.56	158.95
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	196.62	196.62	4.71	48.69	355.99	880.08	352.03	174.24
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	196.62	196.62	4.71	48.69	355.99	928.77	371.51	189.52
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	196.62	196.62	4.71	48.69	355.99	977.46	390.98	204.80
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	196.62	196.62	4.71	48.69	355.99	1026.15	410.46	220.08
19	29.50	30.00	0.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	196.62	196.62	1.57	16.23	355.99	1042.38	416.95	225.18

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
6	28.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	30.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-55	-
Chainage	6+004	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	228.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-55	1.20	22.00	19.50	18.00	458.38	188.62	13.97	3.49
BH-55	1.20	23.50	21.00	19.50	485.56	210.03	14.39	3.60
BH-55	1.20	25.00	22.50	21.00	512.74	231.43	14.81	3.70
BH-55	1.20	26.50	24.00	22.50	539.93	252.83	14.81	3.70
BH-55	1.20	28.00	25.50	24.00	567.11	274.24	15.22	3.81
BH-55	1.20	29.50	27.00	25.50	594.29	295.64	15.63	3.91
BH-55	1.20	30.00	27.50	26.00	603.35	302.77	15.63	3.91

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.35	0.20	21	-	2.00	6.49	1.00	-	3.25	4.00	13.76	27.53	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	4.75	5.50	41.29	55.05	5.65	10.63	97.30	107.93	43.17	11.69
3	5.50	7.00	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	68.81	82.58	5.65	17.72	138.52	166.87	66.75	19.02
4	7.00	8.50	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	96.34	110.10	5.65	24.81	179.73	232.89	93.16	28.34
5	8.50	10.00	1.50	Granular	18.93	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	124.30	138.50	5.65	33.24	261.51	347.92	139.17	40.03
6	10.00	11.50	1.50	Granular	18.93	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	152.69	166.89	5.65	40.84	311.48	438.72	175.49	53.84
7	11.50	13.00	1.50	Granular	9.12	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	173.73	180.58	5.65	48.18	374.91	550.34	220.14	69.70
8	13.00	14.50	1.50	Granular	10.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	188.60	196.62	5.65	52.31	409.03	636.76	254.70	86.72
9	14.50	16.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	204.64	212.66	5.65	58.78	498.65	785.17	314.07	105.56
10	16.00	17.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	220.68	228.70	5.65	63.39	535.30	885.20	354.08	125.68
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	228.70	228.70	5.65	65.69	535.30	950.89	380.36	146.45
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	228.70	228.70	5.65	65.69	535.30	1016.58	406.63	167.22
13	20.50	22.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	21.25	22.00	228.70	228.70	5.65	67.96	596.70	1145.94	458.38	188.62
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	228.70	228.70	5.65	67.96	596.70	1213.90	485.56	210.03
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	228.70	228.70	5.65	67.96	596.70	1281.86	512.74	231.43
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	228.70	228.70	5.65	67.96	596.70	1349.81	539.93	252.83
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	228.70	228.70	5.65	67.96	596.70	1417.77	567.11	274.24
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	228.70	228.70	5.65	67.96	596.70	1485.73	594.29	295.64
19	29.50	30.00	0.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	228.70	228.70	1.88	22.65	596.70	1508.38	603.35	302.77

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
6	28.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	30.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-56	-
Chainage	6+182	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	185.56	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-56	1.00	22.00	19.50	16.50	257.70	129.90	10.73	2.68
BH-56	1.00	23.50	21.00	18.00	275.05	143.56	10.73	2.68
BH-56	1.00	25.00	22.50	19.50	321.13	158.08	11.10	2.77
BH-56	1.00	26.50	24.00	21.00	339.51	172.59	11.10	2.77
BH-56	1.00	28.00	25.50	22.50	357.64	187.11	11.45	2.86
BH-56	1.00	29.50	27.00	24.00	376.02	201.62	11.80	2.95
BH-56	1.00	30.00	27.50	24.50	382.15	206.46	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α_i)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.30	0.02	21	-	2.00	6.49	1.00	-	3.25	4.00	11.48	22.95	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	15.30	0.02	21	-	2.00	6.49	1.00	-	4.75	5.50	34.43	45.90	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	18.50	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	59.78	73.65	4.71	11.84	62.62	74.46	29.78	11.01
4	7.00	8.50	1.50	Granular	18.50	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	87.53	101.40	4.71	17.34	84.02	113.20	45.28	17.52
5	8.50	10.00	1.50	Granular	18.93	0.07	24	-	8.00	9.78	1.00	-	9.25	10.00	115.60	129.80	4.71	22.90	106.05	158.13	63.25	25.58
6	10.00	11.50	1.50	Granular	18.93	0.07	24	-	8.00	9.78	1.00	-	10.75	11.50	143.99	158.19	4.71	28.53	127.94	208.55	83.42	35.21
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	165.03	171.88	4.71	38.14	247.01	365.76	146.30	47.54
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	178.72	185.56	4.71	41.31	266.23	426.28	170.51	60.76
9	14.50	16.00	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	185.56	185.56	4.71	44.42	300.73	505.20	202.08	74.85
10	16.00	17.50	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	185.56	185.56	4.71	44.42	300.73	549.62	219.85	88.93
11	17.50	19.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	185.56	185.56	4.71	42.89	266.70	558.48	223.39	102.59
12	19.00	20.50	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	185.56	185.56	4.71	42.89	266.70	601.37	240.55	116.25
13	20.50	22.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	185.56	185.56	4.71	42.89	266.70	644.25	257.70	129.90
14	22.00	23.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	185.56	185.56	4.71	42.89	267.20	687.64	275.05	143.56
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	185.56	185.56	4.71	45.95	336.43	802.82	321.13	158.08
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	185.56	185.56	4.71	45.95	336.43	848.77	339.51	172.59
17	26.50	28.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	185.56	185.56	4.71	45.95	335.82	894.10	357.64	187.11
18	28.00	29.50	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	185.56	185.56	4.71	45.95	335.82	940.05	376.02	201.62
19	29.50	30.00	0.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	185.56	185.56	1.57	15.32	335.82	955.37	382.15	206.46

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
3	24.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
5	27.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
6	28.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-56	-
Chainage	6+182	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	192.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquifiable Soil Depth	5.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-56	1.20	22.00	19.50	16.50	298.09	152.70	13.94	3.49
BH-56	1.20	23.50	21.00	18.00	315.64	167.12	13.94	3.49
BH-56	1.20	25.00	22.50	19.50	367.75	182.40	14.41	3.60
BH-56	1.20	26.50	24.00	21.00	386.19	197.69	14.41	3.60
BH-56	1.20	28.00	25.50	22.50	404.20	212.97	14.88	3.72
BH-56	1.20	29.50	27.00	24.00	422.64	228.25	15.33	3.83
BH-56	1.20	30.00	27.50	24.50	428.78	233.34	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	15.30	0.02	21	-	2.00	6.49	1.00	-	3.25	4.00	11.48	22.95	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	15.30	0.02	21	-	2.00	6.49	1.00	-	4.75	5.50	34.43	45.90	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	18.50	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	59.78	73.65	5.65	14.21	91.85	106.06	42.43	15.06
4	7.00	8.50	1.50	Granular	18.50	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	87.53	101.40	5.65	20.81	122.66	157.68	63.07	23.26
5	8.50	10.00	1.50	Granular	18.93	0.07	24	-	8.00	9.78	1.00	-	9.25	10.00	115.60	129.80	5.65	27.48	154.42	216.92	86.77	33.33
6	10.00	11.50	1.50	Granular	18.93	0.07	24	-	8.00	9.78	1.00	-	10.75	11.50	143.99	158.19	5.65	34.23	185.95	282.68	113.07	45.29
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	165.03	171.88	5.65	45.77	357.32	499.82	199.93	60.48
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	178.72	185.56	5.65	49.57	384.99	577.06	230.82	76.74
9	14.50	16.00	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	192.40	199.25	5.65	55.27	466.13	713.47	285.39	94.59
10	16.00	17.50	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	155.12	155.12	5.65	44.56	365.33	657.21	262.89	109.44
11	17.50	19.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	155.12	155.12	5.65	43.02	324.26	659.17	263.67	123.86
12	19.00	20.50	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	155.12	155.12	5.65	43.02	324.26	702.19	280.88	138.28
13	20.50	22.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	155.12	155.12	5.65	43.02	324.26	745.22	298.09	152.70
14	22.00	23.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	155.12	155.12	5.65	43.02	325.12	789.09	315.64	167.12
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	155.12	155.12	5.65	46.09	409.30	919.37	367.75	182.40
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	155.12	155.12	5.65	46.09	409.30	965.46	386.19	197.69
17	26.50	28.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	155.12	155.12	5.65	46.09	408.24	1010.49	404.20	212.97
18	28.00	29.50	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	155.12	155.12	5.65	46.09	408.24	1056.59	422.64	228.25
19	29.50	30.00	0.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	155.12	155.12	1.88	15.36	408.24	1071.95	428.78	233.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_1/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
3	24.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
5	27.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
6	28.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-57	-
Chainage	6+246	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	202.45	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-57	1.00	20.50	18.00	18.00	283.84	129.22	10.45	2.61
BH-57	1.00	22.00	19.50	19.50	303.23	144.44	11.02	2.76
BH-57	1.00	23.50	21.00	21.00	338.36	160.13	11.30	2.83
BH-57	1.00	25.00	22.50	22.50	358.41	175.81	11.58	2.89
BH-57	1.00	26.50	24.00	24.00	378.47	191.50	11.85	2.96
BH-57	1.00	28.00	25.50	25.50	398.52	207.18	12.12	3.03
BH-57	1.00	29.50	27.00	27.00	418.57	222.87	12.12	3.03
BH-57	1.00	31.00	28.50	28.50	438.62	238.56	12.39	3.10
BH-57	1.00	32.50	30.00	30.00	458.68	254.24	12.39	3.10
BH-57	1.00	34.00	31.50	31.50	478.73	269.93	12.39	3.10
BH-57	1.00	35.00	32.50	32.50	492.10	280.39	12.39	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{su})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.93	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	14.20	28.40	4.71	2.58	19.96	22.54	9.02	5.12
2	4.00	5.50	1.50	Granular	18.93	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	42.59	56.79	4.71	7.73	36.94	47.25	18.90	8.94
3	5.50	7.00	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	70.99	85.19	4.71	14.65	80.51	105.48	42.19	14.69
4	7.00	8.50	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	99.38	113.58	4.71	20.51	104.87	150.34	60.13	22.08
5	8.50	10.00	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	127.78	141.98	4.71	26.37	129.22	201.05	80.42	31.11
6	10.00	11.50	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	156.17	170.37	4.71	32.23	153.57	257.63	103.05	41.78
7	11.50	13.00	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	178.39	186.41	4.71	39.76	233.62	377.44	150.98	54.56
8	13.00	14.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	194.43	202.45	4.71	43.33	253.22	440.38	176.15	68.35
9	14.50	16.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	202.45	202.45	4.71	48.46	328.61	564.23	225.69	83.57
10	16.00	17.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	202.45	202.45	4.71	48.46	328.61	612.69	245.08	98.78
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	202.45	202.45	4.71	48.46	328.61	661.15	264.46	114.00
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	202.45	202.45	4.71	48.46	328.61	709.61	283.84	129.22
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	202.45	202.45	4.71	48.46	328.61	758.07	303.23	144.44
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	202.45	202.45	4.71	50.13	366.31	845.90	338.36	160.13
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	202.45	202.45	4.71	50.13	366.31	896.03	358.41	175.81
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	202.45	202.45	4.71	50.13	366.31	946.16	378.47	191.50
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	202.45	202.45	4.71	50.13	366.31	996.30	398.52	207.18
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	202.45	202.45	4.71	50.13	366.31	1046.43	418.57	222.87
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	202.45	202.45	4.71	50.13	366.31	1096.56	438.62	238.56
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	202.45	202.45	4.71	50.13	366.31	1146.69	458.68	254.24
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	202.45	202.45	4.71	50.13	366.31	1196.83	478.73	269.93
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	202.45	202.45	3.14	33.42	366.31	1230.25	492.10	280.39

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
2	22.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
6	28.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	29.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	31.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	32.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	34.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	35.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-57	-
Chainage	6+246	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	234.53	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-57	1.20	20.50	18.00	18.00	413.39	168.22	13.68	3.42
BH-57	1.20	22.00	19.50	19.50	440.34	189.45	14.43	3.61
BH-57	1.20	23.50	21.00	21.00	493.38	211.34	14.79	3.70
BH-57	1.20	25.00	22.50	22.50	521.26	233.23	15.15	3.79
BH-57	1.20	26.50	24.00	24.00	549.14	255.12	15.51	3.88
BH-57	1.20	28.00	25.50	25.50	577.01	277.01	15.86	3.96
BH-57	1.20	29.50	27.00	27.00	604.89	298.90	15.86	3.96
BH-57	1.20	31.00	28.50	28.50	632.77	320.79	16.20	4.05
BH-57	1.20	32.50	30.00	30.00	660.64	342.67	16.20	4.05
BH-57	1.20	34.00	31.50	31.50	688.52	364.56	16.20	4.05
BH-57	1.20	35.00	32.50	32.50	707.11	379.16	16.20	4.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.93	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	14.20	28.40	5.65	3.09	29.61	32.70	13.08	7.20
2	4.00	5.50	1.50	Granular	18.93	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	42.59	56.79	5.65	9.28	54.06	66.43	26.57	12.17
3	5.50	7.00	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	70.99	85.19	5.65	17.58	118.09	148.04	59.22	19.47
4	7.00	8.50	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	99.38	113.58	5.65	24.61	153.16	207.72	83.09	28.74
5	8.50	10.00	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	127.78	141.98	5.65	31.64	188.22	274.43	109.77	39.97
6	10.00	11.50	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	156.17	170.37	5.65	38.67	223.29	348.16	139.27	53.17
7	11.50	13.00	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	178.39	186.41	5.65	47.71	338.09	510.68	204.27	68.91
8	13.00	14.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	194.43	202.45	5.65	52.00	366.32	590.90	236.36	85.84
9	14.50	16.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	210.47	218.49	5.65	60.46	511.98	797.03	318.81	105.15
10	16.00	17.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	226.51	234.53	5.65	65.06	548.63	898.74	359.49	125.74
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	234.53	234.53	5.65	67.37	548.63	966.10	386.44	146.98
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	234.53	234.53	5.65	67.37	548.63	1033.47	413.39	168.22
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	234.53	234.53	5.65	67.37	548.63	1100.84	440.34	189.45
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	234.53	234.53	5.65	69.69	611.56	1233.46	493.38	211.34
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	234.53	234.53	5.65	69.69	611.56	1303.15	521.26	233.23
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	234.53	234.53	5.65	69.69	611.56	1372.85	549.14	255.12
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	234.53	234.53	5.65	69.69	611.56	1442.54	577.01	277.01
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	234.53	234.53	5.65	69.69	611.56	1512.23	604.89	298.90
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	234.53	234.53	5.65	69.69	611.56	1581.92	632.77	320.79
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	234.53	234.53	5.65	69.69	611.56	1651.61	660.64	342.67
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	234.53	234.53	5.65	69.69	611.56	1721.30	688.52	364.56
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	234.53	234.53	3.77	46.46	611.56	1767.76	707.11	379.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
2	22.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
6	28.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	29.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	31.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	32.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	34.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	35.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-58	-
Chainage	6+323	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	202.36	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-58	1.00	20.50	18.00	18.00	265.73	127.27	10.45	2.61
BH-58	1.00	22.00	19.50	19.50	284.44	142.01	11.30	2.83
BH-58	1.00	23.50	21.00	21.00	303.14	156.76	11.58	2.89
BH-58	1.00	25.00	22.50	22.50	353.28	172.44	11.58	2.89
BH-58	1.00	26.50	24.00	24.00	373.57	188.12	11.85	2.96
BH-58	1.00	28.00	25.50	25.50	393.62	203.80	11.85	2.96
BH-58	1.00	29.50	27.00	27.00	413.66	219.48	12.12	3.03
BH-58	1.00	31.00	28.50	28.50	433.70	235.16	12.12	3.03
BH-58	1.00	32.50	30.00	30.00	453.75	250.84	12.12	3.03
BH-58	1.00	34.00	31.50	31.50	473.79	266.52	12.12	3.03
BH-58	1.00	35.00	32.50	32.50	487.16	276.97	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.93	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	14.20	28.40	4.71	2.70	23.91	26.61	10.64	5.15
2	4.00	5.50	1.50	Granular	18.93	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	42.59	56.79	4.71	8.09	43.35	54.13	21.65	9.07
3	5.50	7.00	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	70.99	85.19	4.71	14.65	80.51	105.94	42.38	14.82
4	7.00	8.50	1.50	Granular	19.70	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	99.96	114.74	4.71	20.63	106.16	152.22	60.89	22.24
5	8.50	10.00	1.50	Granular	19.70	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	129.51	144.29	4.71	27.79	159.27	233.12	93.25	31.67
6	10.00	11.50	1.50	Granular	19.70	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	159.06	173.84	4.71	34.14	190.00	297.99	119.19	42.88
7	11.50	13.00	1.50	Granular	9.89	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	181.26	188.68	4.71	40.40	235.95	384.34	153.73	55.84
8	13.00	14.50	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	195.52	202.36	4.71	43.57	252.26	444.22	177.69	69.69
9	14.50	16.00	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	202.36	202.36	4.71	45.10	252.26	489.32	195.73	83.97
10	16.00	17.50	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	202.36	202.36	4.71	45.10	252.26	534.41	213.77	98.25
11	17.50	19.00	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	202.36	202.36	4.71	45.10	252.26	579.51	231.81	112.52
12	19.00	20.50	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	202.36	202.36	4.71	46.77	290.30	664.32	265.73	127.27
13	20.50	22.00	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	202.36	202.36	4.71	46.77	290.30	711.09	284.44	142.01
14	22.00	23.50	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	202.36	202.36	4.71	46.77	290.30	757.86	303.14	156.76
15	23.50	25.00	1.50	Granular	9.89	0.10	30	-	19.50	22.44	1.00	-	24.25	25.00	202.36	202.36	4.71	50.11	365.53	883.21	353.28	172.44
16	25.00	26.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	25.75	26.50	202.36	202.36	4.71	50.11	366.15	933.93	373.57	188.12
17	26.50	28.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	27.25	28.00	202.36	202.36	4.71	50.11	366.15	984.04	393.62	203.80
18	28.00	29.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	28.75	29.50	202.36	202.36	4.71	50.11	366.15	1034.15	413.66	219.48
19	29.50	31.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	30.25	31.00	202.36	202.36	4.71	50.11	366.15	1084.26	433.70	235.16
20	31.00	32.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	31.75	32.50	202.36	202.36	4.71	50.11	366.15	1134.37	453.75	250.84
21	32.50	34.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	33.25	34.00	202.36	202.36	4.71	50.11	366.15	1184.48	473.79	266.52
22	34.00	35.00	1.00	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	34.50	35.00	202.36	202.36	3.14	33.41	366.15	1217.89	487.16	276.97

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
2	22.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
3	23.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	29.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	31.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-58	-
Chainage	6+323	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	229.73	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-58	1.20	20.50	18.00	18.00	378.48	164.36	13.68	3.42
BH-58	1.20	22.00	19.50	19.50	403.96	184.57	14.79	3.70
BH-58	1.20	23.50	21.00	21.00	429.45	204.79	15.15	3.79
BH-58	1.20	25.00	22.50	22.50	506.01	226.28	15.15	3.79
BH-58	1.20	26.50	24.00	24.00	533.74	247.76	15.51	3.88
BH-58	1.20	28.00	25.50	25.50	561.05	269.25	15.51	3.88
BH-58	1.20	29.50	27.00	27.00	588.35	290.74	15.86	3.96
BH-58	1.20	31.00	28.50	28.50	615.66	312.23	15.86	3.96
BH-58	1.20	32.50	30.00	30.00	642.96	333.72	15.86	3.96
BH-58	1.20	34.00	31.50	31.50	670.27	355.21	15.86	3.96
BH-58	1.20	35.00	32.50	32.50	688.48	369.54	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.93	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	14.20	28.40	5.65	3.23	35.72	38.96	15.58	7.24
2	4.00	5.50	1.50	Granular	18.93	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	42.59	56.79	5.65	9.70	63.71	76.65	30.66	12.33
3	5.50	7.00	1.50	Granular	18.93	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	70.99	85.19	5.65	17.58	118.09	148.61	59.44	19.63
4	7.00	8.50	1.50	Granular	19.70	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	99.96	114.74	5.65	24.75	155.11	210.38	84.15	28.93
5	8.50	10.00	1.50	Granular	19.70	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	129.51	144.29	5.65	33.35	232.01	320.63	128.25	40.65
6	10.00	11.50	1.50	Granular	19.70	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	159.06	173.84	5.65	40.96	276.26	405.84	162.34	54.49
7	11.50	13.00	1.50	Granular	9.89	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	181.26	188.68	5.65	48.47	341.32	519.38	207.75	70.44
8	13.00	14.50	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	195.52	202.36	5.65	52.29	364.68	595.03	238.01	87.46
9	14.50	16.00	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	209.20	216.05	5.65	55.95	388.76	675.06	270.03	105.50
10	16.00	17.50	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	222.89	229.73	5.65	59.61	412.85	758.75	303.50	124.56
11	17.50	19.00	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	229.73	229.73	5.65	61.44	412.85	820.19	328.08	144.14
12	19.00	20.50	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	229.73	229.73	5.65	63.71	475.14	946.20	378.48	164.36
13	20.50	22.00	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	229.73	229.73	5.65	63.71	475.14	1009.91	403.96	184.57
14	22.00	23.50	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	229.73	229.73	5.65	63.71	475.14	1073.63	429.45	204.79
15	23.50	25.00	1.50	Granular	9.89	0.10	30	-	19.50	22.44	1.00	-	24.25	25.00	229.73	229.73	5.65	68.27	598.27	1265.02	506.01	226.28
16	25.00	26.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	25.75	26.50	229.73	229.73	5.65	68.27	599.33	1334.35	533.74	247.76
17	26.50	28.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	27.25	28.00	229.73	229.73	5.65	68.27	599.33	1402.62	561.05	269.25
18	28.00	29.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	28.75	29.50	229.73	229.73	5.65	68.27	599.33	1470.88	588.35	290.74
19	29.50	31.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	30.25	31.00	229.73	229.73	5.65	68.27	599.33	1539.15	615.66	312.23
20	31.00	32.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	31.75	32.50	229.73	229.73	5.65	68.27	599.33	1607.41	642.96	333.72
21	32.50	34.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	33.25	34.00	229.73	229.73	5.65	68.27	599.33	1675.68	670.27	355.21
22	34.00	35.00	1.00	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	34.50	35.00	229.73	229.73	3.77	45.51	599.33	1721.19	688.48	369.54

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
2	22.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
3	23.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	29.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	31.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-59	-
Chainage	6+429	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	202.11	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-59	1.00	20.50	18.00	18.00	285.28	130.38	11.58	2.89
BH-59	1.00	22.00	19.50	19.50	304.63	145.57	12.12	3.03
BH-59	1.00	23.50	21.00	21.00	323.98	160.77	12.39	3.10
BH-59	1.00	25.00	22.50	22.50	359.05	176.43	12.39	3.10
BH-59	1.00	26.50	24.00	24.00	379.07	192.09	12.39	3.10
BH-59	1.00	28.00	25.50	25.50	399.09	207.76	12.65	3.16
BH-59	1.00	29.50	27.00	27.00	419.11	223.42	12.65	3.16
BH-59	1.00	31.00	28.50	28.50	439.13	239.08	12.65	3.16
BH-59	1.00	32.50	30.00	30.00	459.15	254.74	12.65	3.16
BH-59	1.00	34.00	31.50	31.50	479.17	270.41	12.65	3.16
BH-59	1.00	35.00	32.50	32.50	492.51	280.85	12.65	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.35	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.76	27.53	4.71	2.50	19.35	21.85	8.74	5.10
2	4.00	5.50	1.50	Granular	18.35	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	41.29	55.05	4.71	7.50	35.81	45.81	18.32	8.85
3	5.50	7.00	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	68.81	82.58	4.71	14.77	94.47	119.23	47.69	14.63
4	7.00	8.50	1.50	Granular	19.70	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	97.35	112.13	4.71	20.89	125.83	171.49	68.59	22.13
5	8.50	10.00	1.50	Granular	19.70	0.09	27	-	13.80	15.50	1.00	-	9.25	10.00	126.90	141.68	4.71	28.28	183.85	257.79	103.12	31.70
6	10.00	11.50	1.50	Granular	19.70	0.09	27	-	13.80	15.50	1.00	-	10.75	11.50	156.45	171.23	4.71	34.87	219.96	328.77	131.51	43.11
7	11.50	13.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	12.25	13.00	178.65	186.07	4.71	41.29	267.41	417.51	167.00	56.32
8	13.00	14.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	13.75	14.50	194.09	202.11	4.71	44.86	290.43	485.38	194.15	70.53
9	14.50	16.00	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	15.25	16.00	202.11	202.11	4.71	46.71	290.43	532.10	212.84	85.26
10	16.00	17.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	16.75	17.50	202.11	202.11	4.71	46.71	290.43	578.81	231.52	99.99
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	202.11	202.11	4.71	48.38	328.07	664.82	265.93	115.18
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	202.11	202.11	4.71	48.38	328.07	713.19	285.28	130.38
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	202.11	202.11	4.71	48.38	328.07	761.57	304.63	145.57
14	22.00	23.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	202.11	202.11	4.71	48.38	328.07	809.95	323.98	160.77
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	202.11	202.11	4.71	50.05	365.70	897.63	359.05	176.43
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	202.11	202.11	4.71	50.05	365.70	947.68	379.07	192.09
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	202.11	202.11	4.71	50.05	365.70	997.73	399.09	207.76
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	202.11	202.11	4.71	50.05	365.70	1047.77	419.11	223.42
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	202.11	202.11	4.71	50.05	365.70	1097.82	439.13	239.08
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	202.11	202.11	4.71	50.05	365.70	1147.87	459.15	254.74
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	202.11	202.11	4.71	50.05	365.70	1197.91	479.17	270.41
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	202.11	202.11	3.14	33.36	365.70	1231.28	492.51	280.85

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	32.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	34.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	35.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-59	-
Chainage	6+429	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	234.19	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-59	1.20	20.50	18.00	18.00	414.93	169.51	15.15	3.79
BH-59	1.20	22.00	19.50	19.50	441.84	190.72	15.86	3.96
BH-59	1.20	23.50	21.00	21.00	468.74	211.94	16.20	4.05
BH-59	1.20	25.00	22.50	22.50	521.72	233.80	16.20	4.05
BH-59	1.20	26.50	24.00	24.00	549.55	255.66	16.20	4.05
BH-59	1.20	28.00	25.50	25.50	577.39	277.52	16.54	4.14
BH-59	1.20	29.50	27.00	27.00	605.22	299.37	16.54	4.14
BH-59	1.20	31.00	28.50	28.50	633.06	321.23	16.54	4.14
BH-59	1.20	32.50	30.00	30.00	660.89	343.09	16.54	4.14
BH-59	1.20	34.00	31.50	31.50	688.73	364.95	16.54	4.14
BH-59	1.20	35.00	32.50	32.50	707.29	379.53	16.54	4.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.35	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.76	27.53	5.65	3.00	28.70	31.70	12.68	7.17
2	4.00	5.50	1.50	Granular	18.35	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	41.29	55.05	5.65	9.00	52.40	64.40	25.76	12.07
3	5.50	7.00	1.50	Granular	18.35	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	68.81	82.58	5.65	17.72	138.52	168.23	67.29	19.40
4	7.00	8.50	1.50	Granular	19.70	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	97.35	112.13	5.65	25.07	183.86	238.64	95.46	28.80
5	8.50	10.00	1.50	Granular	19.70	0.09	27	-	13.80	15.50	1.00	-	9.25	10.00	126.90	141.68	5.65	33.94	267.83	356.56	142.62	40.68
6	10.00	11.50	1.50	Granular	19.70	0.09	27	-	13.80	15.50	1.00	-	10.75	11.50	156.45	171.23	5.65	41.84	319.83	450.40	180.16	54.77
7	11.50	13.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	12.25	13.00	178.65	186.07	5.65	49.55	386.84	566.95	226.78	71.02
8	13.00	14.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	13.75	14.50	194.09	202.11	5.65	53.83	420.13	654.07	261.63	88.46
9	14.50	16.00	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	15.25	16.00	210.13	218.15	5.65	58.28	452.57	744.78	297.91	107.15
10	16.00	17.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	16.75	17.50	226.17	234.19	5.65	62.73	485.00	839.95	335.98	127.09
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	234.19	234.19	5.65	67.27	547.84	970.05	388.02	148.30
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	234.19	234.19	5.65	67.27	547.84	1037.32	414.93	169.51
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	234.19	234.19	5.65	67.27	547.84	1104.59	441.84	190.72
14	22.00	23.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	234.19	234.19	5.65	67.27	547.84	1171.86	468.74	211.94
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	234.19	234.19	5.65	69.59	610.68	1304.29	521.72	233.80
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	234.19	234.19	5.65	69.59	610.68	1373.88	549.55	255.66
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	234.19	234.19	5.65	69.59	610.68	1443.47	577.39	277.52
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	234.19	234.19	5.65	69.59	610.68	1513.06	605.22	299.37
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	234.19	234.19	5.65	69.59	610.68	1582.65	633.06	321.23
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	234.19	234.19	5.65	69.59	610.68	1652.24	660.89	343.09
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	234.19	234.19	5.65	69.59	610.68	1721.82	688.73	364.95
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	234.19	234.19	3.77	46.39	610.68	1768.22	707.29	379.53

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	32.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	34.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	35.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-60	-
Chainage	6+488	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	198.72	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-60	1.00	20.50	18.00	18.00	278.43	127.09	10.74	2.68
BH-60	1.00	22.00	19.50	19.50	297.46	142.06	11.02	2.76
BH-60	1.00	23.50	21.00	21.00	331.94	157.48	11.30	2.83
BH-60	1.00	25.00	22.50	22.50	351.63	172.91	11.30	2.83
BH-60	1.00	26.50	24.00	24.00	371.31	188.34	11.58	2.89
BH-60	1.00	28.00	25.50	25.50	390.99	203.77	11.58	2.89
BH-60	1.00	29.50	27.00	27.00	410.68	219.19	11.85	2.96
BH-60	1.00	31.00	28.50	28.50	430.36	234.62	11.85	2.96
BH-60	1.00	32.50	30.00	30.00	450.04	250.05	11.85	2.96
BH-60	1.00	34.00	31.50	31.50	469.73	265.48	11.85	2.96
BH-60	1.00	35.00	32.50	32.50	482.85	275.76	11.85	2.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.93	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	14.20	28.40	4.71	2.58	19.96	22.54	9.02	5.12
2	4.00	5.50	1.50	Granular	18.93	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	42.59	56.79	4.71	7.73	36.94	47.25	18.90	8.94
3	5.50	7.00	1.50	Granular	18.93	0.06	24	-	8.00	9.78	1.00	-	6.25	7.00	70.99	85.19	4.71	14.06	71.65	96.03	38.41	14.52
4	7.00	8.50	1.50	Granular	18.70	0.06	24	-	8.00	9.78	1.00	-	7.75	8.50	99.21	113.24	4.71	19.65	93.20	137.23	54.89	21.67
5	8.50	10.00	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	127.26	141.29	4.71	27.31	155.68	227.02	90.81	30.97
6	10.00	11.50	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	155.31	169.34	4.71	33.33	184.85	289.52	115.81	41.95
7	11.50	13.00	1.50	Granular	8.89	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	176.01	182.68	4.71	39.23	228.08	371.98	148.79	54.59
8	13.00	14.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	190.70	198.72	4.71	42.50	248.66	435.06	174.02	68.13
9	14.50	16.00	1.50	Granular	10.69	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	198.72	198.72	4.71	45.93	285.67	518.00	207.20	82.64
10	16.00	17.50	1.50	Granular	10.69	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	198.72	198.72	4.71	45.93	285.67	563.92	225.57	97.15
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	198.72	198.72	4.71	47.57	322.69	648.50	259.40	112.12
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	198.72	198.72	4.71	47.57	322.69	696.07	278.43	127.09
13	20.50	22.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	21.25	22.00	198.72	198.72	4.71	47.57	322.69	743.64	297.46	142.06
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	198.72	198.72	4.71	49.21	359.70	829.86	331.94	157.48
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	198.72	198.72	4.71	49.21	359.70	879.07	351.63	172.91
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	198.72	198.72	4.71	49.21	359.70	928.28	371.31	188.34
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	198.72	198.72	4.71	49.21	359.70	977.48	390.99	203.77
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	198.72	198.72	4.71	49.21	359.70	1026.69	410.68	219.19
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	198.72	198.72	4.71	49.21	359.70	1075.90	430.36	234.62
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	198.72	198.72	4.71	49.21	359.70	1125.11	450.04	250.05
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	198.72	198.72	4.71	49.21	359.70	1174.31	469.73	265.48
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	198.72	198.72	3.14	32.80	359.70	1207.12	482.85	275.76

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
2	22.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
4	25.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
5	26.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
6	28.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	32.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	34.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	35.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-60	-
Chainage	6+488	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	230.80	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	12.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-60	1.20	20.50	18.00	18.00	406.19	165.57	14.06	3.51
BH-60	1.20	22.00	19.50	19.50	432.71	186.51	14.43	3.61
BH-60	1.20	23.50	21.00	21.00	484.92	208.08	14.79	3.70
BH-60	1.20	25.00	22.50	22.50	512.36	229.66	14.79	3.70
BH-60	1.20	26.50	24.00	24.00	539.79	251.24	15.15	3.79
BH-60	1.20	28.00	25.50	25.50	567.22	272.82	15.15	3.79
BH-60	1.20	29.50	27.00	27.00	594.66	294.40	15.51	3.88
BH-60	1.20	31.00	28.50	28.50	622.09	315.97	15.51	3.88
BH-60	1.20	32.50	30.00	30.00	649.52	337.55	15.51	3.88
BH-60	1.20	34.00	31.50	31.50	676.95	359.13	15.51	3.88
BH-60	1.20	35.00	32.50	32.50	695.24	373.51	15.51	3.88

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	18.93	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	14.20	28.40	5.65	3.09	29.61	32.70	13.08	7.20
2	4.00	5.50	1.50	Granular	18.93	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	42.59	56.79	5.65	9.28	54.06	66.43	26.57	12.17
3	5.50	7.00	1.50	Granular	18.93	0.06	24	-	8.00	9.78	1.00	-	6.25	7.00	70.99	85.19	5.65	16.88	104.89	134.15	53.66	19.27
4	7.00	8.50	1.50	Granular	18.70	0.06	24	-	8.00	9.78	1.00	-	7.75	8.50	99.21	113.24	5.65	23.58	135.91	188.75	75.50	28.25
5	8.50	10.00	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	127.26	141.29	5.65	32.77	226.71	312.32	124.93	39.80
6	10.00	11.50	1.50	Granular	18.70	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	155.31	169.34	5.65	40.00	268.71	394.32	157.73	53.38
7	11.50	13.00	1.50	Granular	8.89	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	176.01	182.68	5.65	47.07	329.82	502.50	201.00	68.93
8	13.00	14.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	190.70	198.72	5.65	51.00	359.74	583.42	233.37	85.59
9	14.50	16.00	1.50	Granular	10.69	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	206.74	214.76	5.65	57.34	445.71	726.72	290.69	104.02
10	16.00	17.50	1.50	Granular	10.69	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	222.78	230.80	5.65	61.79	478.15	820.94	328.38	123.69
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	230.80	230.80	5.65	66.30	540.10	949.19	379.68	144.63
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	230.80	230.80	5.65	66.30	540.10	1015.49	406.19	165.57
13	20.50	22.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	21.25	22.00	230.80	230.80	5.65	66.30	540.10	1081.78	432.71	186.51
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	230.80	230.80	5.65	68.58	602.05	1212.31	484.92	208.08
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	230.80	230.80	5.65	68.58	602.05	1280.89	512.36	229.66
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	230.80	230.80	5.65	68.58	602.05	1349.48	539.79	251.24
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	230.80	230.80	5.65	68.58	602.05	1418.06	567.22	272.82
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	230.80	230.80	5.65	68.58	602.05	1486.64	594.66	294.40
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	230.80	230.80	5.65	68.58	602.05	1555.22	622.09	315.97
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	230.80	230.80	5.65	68.58	602.05	1623.80	649.52	337.55
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	230.80	230.80	5.65	68.58	602.05	1692.38	676.95	359.13
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	230.80	230.80	3.77	45.72	602.05	1738.11	695.24	373.51

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
2	22.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
4	25.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
5	26.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
6	28.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	32.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	34.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	35.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-51	-
Chainage	5+596	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.10	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-51	1.00	20.50	18.00	16.50	142.09	76.92	9.71	2.43
BH-51	1.00	22.00	19.50	18.00	151.96	85.69	10.06	2.51
BH-51	1.00	23.50	21.00	19.50	162.14	94.46	10.06	2.51
BH-51	1.00	25.00	22.50	21.00	172.31	103.24	10.40	2.60
BH-51	1.00	26.50	24.00	22.50	200.30	112.52	10.73	2.68
BH-51	1.00	28.00	25.50	24.00	211.20	121.80	11.06	2.77
BH-51	1.00	29.50	27.00	25.50	222.11	131.09	11.06	2.77
BH-51	1.00	31.00	28.50	27.00	233.01	140.37	11.38	2.85
BH-51	1.00	32.50	30.00	28.50	243.92	149.65	11.38	2.85
BH-51	1.00	34.00	31.50	30.00	254.82	158.94	11.70	2.93
BH-51	1.00	35.00	32.50	31.00	262.09	165.12	11.70	2.93

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{su})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.44	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	6.33	12.67	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.44	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	19.00	25.33	4.71	3.76	22.19	25.96	10.38	7.10
3	5.50	7.00	1.50	Granular	8.44	0.04	24	-	8.00	9.78	1.00	-	6.25	7.00	31.66	38.00	4.71	6.27	31.96	41.99	16.80	10.51
4	7.00	8.50	1.50	Granular	8.44	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	44.33	50.66	4.71	9.51	56.64	76.19	30.47	14.82
5	8.50	10.00	1.50	Granular	8.44	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	56.99	63.33	4.71	12.23	69.81	101.59	40.63	19.89
6	10.00	11.50	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	71.12	78.92	4.71	15.85	102.09	149.72	59.89	25.98
7	11.50	13.00	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	12.25	13.00	86.71	94.51	4.71	19.32	121.14	188.10	75.24	33.04
8	13.00	14.50	1.50	Granular	10.39	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	102.30	110.10	4.71	23.64	161.04	251.64	100.65	41.31
9	14.50	16.00	1.50	Granular	10.39	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	110.10	110.10	4.71	25.45	161.04	277.08	110.83	50.09
10	16.00	17.50	1.50	Granular	10.39	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	110.10	110.10	4.71	26.35	181.88	324.28	129.71	59.11
11	17.50	19.00	1.50	Granular	10.39	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	110.10	110.10	4.71	26.35	181.88	350.63	140.25	68.14
12	19.00	20.50	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	110.10	110.10	4.71	25.45	161.04	355.24	142.09	76.92
13	20.50	22.00	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	110.10	110.10	4.71	25.45	160.25	379.89	151.96	85.69
14	22.00	23.50	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	110.10	110.10	4.71	25.45	160.25	405.34	162.14	94.46
15	23.50	25.00	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	24.25	25.00	110.10	110.10	4.71	25.45	160.25	430.78	172.31	103.24
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	110.10	110.10	4.71	27.26	202.95	500.75	200.30	112.52
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	110.10	110.10	4.71	27.26	202.95	528.01	211.20	121.80
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	110.10	110.10	4.71	27.26	202.95	555.27	222.11	131.09
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	110.10	110.10	4.71	27.26	202.95	582.54	233.01	140.37
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	110.10	110.10	4.71	27.26	202.95	609.80	243.92	149.65
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	110.10	110.10	4.71	27.26	202.95	637.06	254.82	158.94
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	110.10	110.10	3.14	18.18	202.95	655.24	262.09	165.12

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.12	2.00	1.83	7.12	6.50	0.206	0.824	9.71	2.43	34.55	15.79	23.30	5.83	82.92	37.90
2	22.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
3	23.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.14	2.00	1.83	7.03	6.43	0.199	0.795	10.06	2.51	35.37	16.17	24.14	6.03	84.88	38.81
4	25.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
5	26.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
6	28.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
7	29.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
7	31.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
7	32.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
7	34.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
7	35.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-51	-
Chainage	5+596	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	141.28	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-51	1.20	20.50	18.00	16.50	222.53	105.12	12.64	3.16
BH-51	1.20	22.00	19.50	18.00	237.66	118.47	13.09	3.27
BH-51	1.20	23.50	21.00	19.50	253.33	131.82	13.09	3.27
BH-51	1.20	25.00	22.50	21.00	269.00	145.16	13.53	3.38
BH-51	1.20	26.50	24.00	22.50	317.23	159.29	13.97	3.49
BH-51	1.20	28.00	25.50	24.00	334.02	173.42	14.39	3.60
BH-51	1.20	29.50	27.00	25.50	350.82	187.55	14.39	3.60
BH-51	1.20	31.00	28.50	27.00	367.61	201.68	14.81	3.70
BH-51	1.20	32.50	30.00	28.50	384.40	215.81	14.81	3.70
BH-51	1.20	34.00	31.50	30.00	401.19	229.94	15.22	3.81
BH-51	1.20	35.00	32.50	31.00	412.39	239.36	15.22	3.81

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{su})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.44	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	6.33	12.67	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.44	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	19.00	25.33	5.65	4.52	32.72	37.24	14.90	9.97
3	5.50	7.00	1.50	Granular	8.44	0.04	24	-	8.00	9.78	1.00	-	6.25	7.00	31.66	38.00	5.65	7.53	46.79	58.83	23.53	14.46
4	7.00	8.50	1.50	Granular	8.44	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	44.33	50.66	5.65	11.42	82.70	106.16	42.46	20.03
5	8.50	10.00	1.50	Granular	8.44	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	56.99	63.33	5.65	14.68	101.66	139.80	55.92	26.51
6	10.00	11.50	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	71.12	78.92	5.65	19.02	148.64	205.80	82.32	34.21
7	11.50	13.00	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	12.25	13.00	86.71	94.51	5.65	23.19	176.08	256.42	102.57	43.08
8	13.00	14.50	1.50	Granular	10.39	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	102.30	110.10	5.65	28.37	233.75	342.47	136.99	53.40
9	14.50	16.00	1.50	Granular	10.39	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	117.89	125.69	5.65	32.70	265.27	406.69	162.68	64.93
10	16.00	17.50	1.50	Granular	10.39	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	133.48	141.28	5.65	38.34	335.22	514.97	205.99	78.04
11	17.50	19.00	1.50	Granular	10.39	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	141.28	141.28	5.65	40.58	335.22	555.56	222.22	91.78
12	19.00	20.50	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	141.28	141.28	5.65	39.18	296.80	556.32	222.53	105.12
13	20.50	22.00	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	141.28	141.28	5.65	39.18	295.44	594.14	237.66	118.47
14	22.00	23.50	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	141.28	141.28	5.65	39.18	295.44	633.32	253.33	131.82
15	23.50	25.00	1.50	Granular	9.12	0.10	28	-	15.70	17.82	1.00	-	24.25	25.00	141.28	141.28	5.65	39.18	295.44	672.51	269.00	145.16
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	141.28	141.28	5.65	41.98	374.03	793.08	317.23	159.29
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	141.28	141.28	5.65	41.98	374.03	835.06	334.02	173.42
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	141.28	141.28	5.65	41.98	374.03	877.04	350.82	187.55
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	141.28	141.28	5.65	41.98	374.03	919.02	367.61	201.68
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	141.28	141.28	5.65	41.98	374.03	961.00	384.40	215.81
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	141.28	141.28	5.65	41.98	374.03	1002.98	401.19	229.94
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	141.28	141.28	3.77	27.99	374.03	1030.97	412.39	239.36

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	0.97	2.02	1.83	8.31	7.55	0.158	0.633	12.64	3.16	52.53	23.86	30.34	7.58	126.06	57.27
2	22.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
3	23.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.98	2.02	1.83	8.21	7.47	0.153	0.611	13.09	3.27	53.77	24.44	31.42	7.85	129.04	58.65
4	25.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
5	26.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
6	28.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
7	29.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
7	31.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
7	32.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
7	34.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
7	35.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-52	-
Chainage	5+718	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.77	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-52	1.00	20.50	18.00	18.00	152.65	78.11	11.02	2.76
BH-52	1.00	22.00	19.50	19.50	163.25	87.18	11.30	2.83
BH-52	1.00	23.50	21.00	21.00	173.86	96.26	11.30	2.83
BH-52	1.00	25.00	22.50	22.50	193.23	105.59	11.58	2.89
BH-52	1.00	26.50	24.00	24.00	204.20	114.92	11.58	2.89
BH-52	1.00	28.00	25.50	25.50	215.17	124.25	11.85	2.96
BH-52	1.00	29.50	27.00	27.00	226.14	133.58	11.85	2.96
BH-52	1.00	31.00	28.50	28.50	237.11	142.91	11.85	2.96
BH-52	1.00	32.50	30.00	30.00	248.09	152.24	12.12	3.03
BH-52	1.00	34.00	31.50	31.50	259.06	161.56	12.12	3.03
BH-52	1.00	35.00	32.50	32.50	266.37	167.78	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.44	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.33	12.67	4.71	1.15	8.90	10.05	4.02	4.72
2	4.00	5.50	1.50	Granular	8.44	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	19.00	25.33	4.71	3.45	16.48	21.08	8.43	7.34
3	5.50	7.00	1.50	Granular	8.89	0.06	25	-	10.00	10.88	1.00	-	6.25	7.00	32.00	38.67	4.71	6.60	36.67	47.87	19.15	10.83
4	7.00	8.50	1.50	Granular	8.89	0.06	25	-	10.00	10.88	1.00	-	7.75	8.50	45.34	52.01	4.71	9.36	48.11	68.67	27.47	15.10
5	8.50	10.00	1.50	Granular	8.89	0.09	26	-	11.90	13.19	1.00	-	9.25	10.00	58.68	65.35	4.71	12.59	72.12	105.28	42.11	20.28
6	10.00	11.50	1.50	Granular	8.89	0.09	26	-	11.90	13.19	1.00	-	10.75	11.50	72.02	78.69	4.71	15.46	86.00	134.60	53.84	26.26
7	11.50	13.00	1.50	Granular	10.69	0.06	28	-	15.70	17.82	1.00	-	12.25	13.00	86.71	94.73	4.71	20.04	139.65	208.30	83.32	33.52
8	13.00	14.50	1.50	Granular	10.69	0.06	28	-	15.70	17.82	1.00	-	13.75	14.50	102.75	110.77	4.71	23.75	162.17	254.57	101.83	41.81
9	14.50	16.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	110.77	110.77	4.71	26.52	183.16	302.07	120.83	50.89
10	16.00	17.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	110.77	110.77	4.71	26.52	183.16	328.59	131.43	59.96
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	110.77	110.77	4.71	26.52	183.16	355.10	142.04	69.04
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	110.77	110.77	4.71	26.52	183.16	381.62	152.65	78.11
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	110.77	110.77	4.71	26.52	183.16	408.13	163.25	87.18
14	22.00	23.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	110.77	110.77	4.71	26.52	183.16	434.65	173.86	96.26
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	110.77	110.77	4.71	27.43	204.15	483.07	193.23	105.59
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	110.77	110.77	4.71	27.43	204.15	510.50	204.20	114.92
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	110.77	110.77	4.71	27.43	204.15	537.93	215.17	124.25
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	110.77	110.77	4.71	27.43	204.15	565.36	226.14	133.58
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	110.77	110.77	4.71	27.43	204.15	592.79	237.11	142.91
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	110.77	110.77	4.71	27.43	204.15	620.22	248.09	152.24
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	110.77	110.77	4.71	27.43	204.15	647.65	259.06	161.56
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	110.77	110.77	3.14	18.29	204.15	665.93	266.37	167.78

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
2	22.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-52	-
Chainage	5+718	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	142.85	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-52	1.20	20.50	18.00	18.00	241.99	106.88	14.43	3.61
BH-52	1.20	22.00	19.50	19.50	258.40	120.75	14.79	3.70
BH-52	1.20	23.50	21.00	21.00	274.82	134.61	14.79	3.70
BH-52	1.20	25.00	22.50	22.50	307.34	148.87	15.15	3.79
BH-52	1.20	26.50	24.00	24.00	324.32	163.13	15.15	3.79
BH-52	1.20	28.00	25.50	25.50	341.30	177.39	15.51	3.88
BH-52	1.20	29.50	27.00	27.00	358.28	191.65	15.51	3.88
BH-52	1.20	31.00	28.50	28.50	375.26	205.91	15.51	3.88
BH-52	1.20	32.50	30.00	30.00	392.24	220.17	15.86	3.96
BH-52	1.20	34.00	31.50	31.50	409.22	234.44	15.86	3.96
BH-52	1.20	35.00	32.50	32.50	420.54	243.94	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.44	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.33	12.67	5.65	1.38	13.21	14.59	5.83	6.72
2	4.00	5.50	1.50	Granular	8.44	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	19.00	25.33	5.65	4.14	24.11	29.63	11.85	10.25
3	5.50	7.00	1.50	Granular	8.89	0.06	25	-	10.00	10.88	1.00	-	6.25	7.00	32.00	38.67	5.65	7.92	53.81	67.26	26.90	14.85
4	7.00	8.50	1.50	Granular	8.89	0.06	25	-	10.00	10.88	1.00	-	7.75	8.50	45.34	52.01	5.65	11.23	70.29	94.96	37.98	20.37
5	8.50	10.00	1.50	Granular	8.89	0.09	26	-	11.90	13.19	1.00	-	9.25	10.00	58.68	65.35	5.65	15.11	105.06	144.84	57.94	26.97
6	10.00	11.50	1.50	Granular	8.89	0.09	26	-	11.90	13.19	1.00	-	10.75	11.50	72.02	78.69	5.65	18.55	125.03	183.37	73.35	34.54
7	11.50	13.00	1.50	Granular	10.69	0.06	28	-	15.70	17.82	1.00	-	12.25	13.00	86.71	94.73	5.65	24.05	203.00	285.38	114.15	43.65
8	13.00	14.50	1.50	Granular	10.69	0.06	28	-	15.70	17.82	1.00	-	13.75	14.50	102.75	110.77	5.65	28.50	235.43	346.31	138.52	54.00
9	14.50	16.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	118.79	126.81	5.65	34.12	302.53	447.53	179.01	65.93
10	16.00	17.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	134.83	142.85	5.65	38.73	339.18	522.90	209.16	79.15
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	142.85	142.85	5.65	41.03	339.18	563.94	225.58	93.02
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	142.85	142.85	5.65	41.03	339.18	604.97	241.99	106.88
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	142.85	142.85	5.65	41.03	339.18	646.01	258.40	120.75
14	22.00	23.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	142.85	142.85	5.65	41.03	339.18	687.04	274.82	134.61
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	142.85	142.85	5.65	42.45	378.05	768.36	307.34	148.87
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	142.85	142.85	5.65	42.45	378.05	810.81	324.32	163.13
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	142.85	142.85	5.65	42.45	378.05	853.26	341.30	177.39
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	142.85	142.85	5.65	42.45	378.05	895.70	358.28	191.65
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	142.85	142.85	5.65	42.45	378.05	938.15	375.26	205.91
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	142.85	142.85	5.65	42.45	378.05	980.60	392.24	220.17
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	142.85	142.85	5.65	42.45	378.05	1023.05	409.22	234.44
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	142.85	142.85	3.77	28.30	378.05	1051.35	420.54	243.94

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
2	22.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-53	-
Chainage	5+830	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.94	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-53	1.00	20.50	18.00	18.00	128.50	74.96	9.25	2.31
BH-53	1.00	22.00	19.50	19.50	154.49	83.64	9.25	2.31
BH-53	1.00	23.50	21.00	21.00	164.53	92.32	9.25	2.31
BH-53	1.00	25.00	22.50	22.50	174.58	101.00	9.56	2.39
BH-53	1.00	26.50	24.00	24.00	184.63	109.69	9.86	2.46
BH-53	1.00	28.00	25.50	25.50	202.99	118.61	10.16	2.54
BH-53	1.00	29.50	27.00	27.00	213.39	127.54	10.16	2.54
BH-53	1.00	31.00	28.50	28.50	223.78	136.46	10.45	2.61
BH-53	1.00	32.50	30.00	30.00	234.17	145.39	10.45	2.61
BH-53	1.00	34.00	31.50	31.50	244.57	154.31	10.74	2.68
BH-53	1.00	35.00	32.50	32.50	251.50	160.26	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.52	13.04	4.71	1.18	9.17	10.35	4.14	4.73
2	4.00	5.50	1.50	Granular	8.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	19.56	26.08	4.71	3.55	16.96	21.70	8.68	7.37
3	5.50	7.00	1.50	Granular	8.69	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	32.60	39.12	4.71	6.46	32.90	44.10	17.64	10.83
4	7.00	8.50	1.50	Granular	8.54	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	45.53	51.94	4.71	9.02	42.74	62.95	25.18	15.01
5	8.50	10.00	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	58.34	64.75	4.71	12.52	71.34	104.07	41.63	20.16
6	10.00	11.50	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	71.16	77.57	4.71	15.27	84.66	132.67	53.07	26.09
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	84.41	91.25	4.71	19.51	133.79	201.30	80.52	33.20
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	98.09	104.94	4.71	22.67	153.01	243.19	97.28	41.20
9	14.50	16.00	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	104.94	104.94	4.71	25.12	172.81	288.12	115.25	49.88
10	16.00	17.50	1.50	Granular	9.89	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	104.94	104.94	4.71	25.12	173.35	313.77	125.51	58.56
11	17.50	19.00	1.50	Granular	9.89	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	104.94	104.94	4.71	23.39	133.62	297.43	118.97	66.76
12	19.00	20.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	19.75	20.50	104.94	104.94	4.71	23.39	134.05	321.25	128.50	74.96
13	20.50	22.00	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	104.94	104.94	4.71	25.12	173.90	386.22	154.49	83.64
14	22.00	23.50	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	104.94	104.94	4.71	25.12	173.90	411.33	164.53	92.32
15	23.50	25.00	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	104.94	104.94	4.71	25.12	173.90	436.45	174.58	101.00
16	25.00	26.50	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	25.75	26.50	104.94	104.94	4.71	25.12	173.90	461.57	184.63	109.69
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	104.94	104.94	4.71	25.98	193.83	507.48	202.99	118.61
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	104.94	104.94	4.71	25.98	193.83	533.47	213.39	127.54
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	104.94	104.94	4.71	25.98	193.83	559.45	223.78	136.46
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	104.94	104.94	4.71	25.98	193.83	585.44	234.17	145.39
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	104.94	104.94	4.71	25.98	193.83	611.42	244.57	154.31
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	104.94	104.94	3.14	17.32	193.83	628.74	251.50	160.26

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
2	22.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
3	23.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	0.71	2.06	1.85	7.23	6.49	0.216	0.865	9.25	2.31	33.44	15.01	22.19	5.55	80.26	36.03
4	25.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	0.72	2.05	1.85	7.15	6.43	0.209	0.837	9.56	2.39	34.18	15.35	22.94	5.73	82.04	36.84
5	26.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
6	28.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
7	29.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
7	31.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
7	32.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
7	34.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	35.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-53	-
Chainage	5+830	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	133.46	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-53	1.20	20.50	18.00	18.00	197.13	101.88	12.11	3.03
BH-53	1.20	22.00	19.50	19.50	241.59	114.99	12.11	3.03
BH-53	1.20	23.50	21.00	21.00	256.93	128.09	12.11	3.03
BH-53	1.20	25.00	22.50	22.50	272.26	141.20	12.52	3.13
BH-53	1.20	26.50	24.00	24.00	287.60	154.31	12.91	3.23
BH-53	1.20	28.00	25.50	25.50	318.02	167.79	13.30	3.32
BH-53	1.20	29.50	27.00	27.00	333.88	181.27	13.30	3.32
BH-53	1.20	31.00	28.50	28.50	349.75	194.75	13.68	3.42
BH-53	1.20	32.50	30.00	30.00	365.61	208.23	13.68	3.42
BH-53	1.20	34.00	31.50	31.50	381.47	221.71	14.06	3.51
BH-53	1.20	35.00	32.50	32.50	392.05	230.70	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.52	13.04	5.65	1.42	13.60	15.02	6.01	6.73
2	4.00	5.50	1.50	Granular	8.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	19.56	26.08	5.65	4.26	24.82	30.51	12.20	10.30
3	5.50	7.00	1.50	Granular	8.69	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	32.60	39.12	5.65	7.75	48.17	61.60	24.64	14.84
4	7.00	8.50	1.50	Granular	8.54	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	45.53	51.94	5.65	10.82	62.32	86.57	34.63	20.25
5	8.50	10.00	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	58.34	64.75	5.65	15.03	103.88	143.16	57.26	26.83
6	10.00	11.50	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	71.16	77.57	5.65	18.33	123.07	180.67	72.27	34.34
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	84.41	91.25	5.65	23.41	194.28	275.30	110.12	43.27
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	98.09	104.94	5.65	27.21	221.95	330.18	132.07	53.26
9	14.50	16.00	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	111.78	118.62	5.65	32.11	281.94	422.27	168.91	64.63
10	16.00	17.50	1.50	Granular	9.89	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	126.04	133.46	5.65	36.20	316.76	493.30	197.32	77.14
11	17.50	19.00	1.50	Granular	9.89	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	133.46	133.46	5.65	35.69	244.16	456.39	182.55	89.51
12	19.00	20.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	19.75	20.50	133.46	133.46	5.65	35.69	244.91	492.83	197.13	101.88
13	20.50	22.00	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	133.46	133.46	5.65	38.34	317.72	603.98	241.59	114.99
14	22.00	23.50	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	133.46	133.46	5.65	38.34	317.72	642.32	256.93	128.09
15	23.50	25.00	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	133.46	133.46	5.65	38.34	317.72	680.65	272.26	141.20
16	25.00	26.50	1.50	Granular	10.69	0.03	29	-	17.60	20.13	1.00	-	25.75	26.50	133.46	133.46	5.65	38.34	317.72	718.99	287.60	154.31
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	133.46	133.46	5.65	39.66	354.13	795.05	318.02	167.79
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	133.46	133.46	5.65	39.66	354.13	834.71	333.88	181.27
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	133.46	133.46	5.65	39.66	354.13	874.37	349.75	194.75
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	133.46	133.46	5.65	39.66	354.13	914.03	365.61	208.23
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	133.46	133.46	5.65	39.66	354.13	953.69	381.47	221.71
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	133.46	133.46	3.77	26.44	354.13	980.12	392.05	230.70

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
2	22.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
3	23.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	0.61	2.07	1.85	8.43	7.53	0.165	0.660	12.11	3.03	51.05	22.81	29.07	7.27	122.53	54.74
4	25.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.62	2.07	1.85	8.34	7.45	0.160	0.639	12.52	3.13	52.18	23.32	30.04	7.51	125.23	55.97
5	26.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
6	28.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
7	29.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
7	31.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
7	32.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
7	34.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	35.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-54	-
Chainage	5+939	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.26	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-54	1.00	22.00	19.50	19.50	162.48	83.99	9.56	2.39
BH-54	1.00	23.50	21.00	21.00	172.81	92.87	9.86	2.46
BH-54	1.00	25.00	22.50	22.50	183.14	101.75	10.16	2.54
BH-54	1.00	26.50	24.00	24.00	193.46	110.63	10.45	2.61
BH-54	1.00	28.00	25.50	25.50	203.79	119.50	10.45	2.61
BH-54	1.00	29.50	27.00	27.00	214.12	128.38	10.74	2.68
BH-54	1.00	30.00	27.50	27.50	217.56	131.34	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α_i)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	3.25	4.00	6.41	12.82	4.71	1.38	17.33	18.71	7.48	4.78
2	4.00	5.50	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	4.75	5.50	19.22	25.63	4.71	4.13	30.66	36.16	14.46	7.59
3	5.50	7.00	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	32.04	38.45	4.71	6.88	43.98	56.36	22.54	11.16
4	7.00	8.50	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	44.85	51.26	4.71	9.63	57.31	79.31	31.72	15.51
5	8.50	10.00	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	57.67	64.08	4.71	12.38	70.63	105.01	42.00	20.62
6	10.00	11.50	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	70.48	76.89	4.71	15.13	83.96	133.46	53.39	26.51
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	83.73	90.58	4.71	19.35	132.84	201.70	80.68	33.57
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	97.42	104.26	4.71	22.52	152.06	243.43	97.37	41.53
9	14.50	16.00	1.50	Granular	10.69	0.03	27	-	13.80	15.50	1.00	-	15.25	16.00	104.26	104.26	4.71	23.24	133.23	247.84	99.13	49.68
10	16.00	17.50	1.50	Granular	10.69	0.03	27	-	13.80	15.50	1.00	-	16.75	17.50	104.26	104.26	4.71	23.24	133.23	271.07	108.43	57.84
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	104.26	104.26	4.71	24.96	172.83	335.63	134.25	66.48
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	104.26	104.26	4.71	24.96	172.83	360.59	144.24	75.11
13	20.50	22.00	1.50	Granular	10.69	0.09	30	-	19.50	22.44	1.00	-	21.25	22.00	104.26	104.26	4.71	25.82	192.63	406.21	162.48	83.99
14	22.00	23.50	1.50	Granular	10.69	0.09	30	-	19.50	22.44	1.00	-	22.75	23.50	104.26	104.26	4.71	25.82	192.63	432.03	172.81	92.87
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	104.26	104.26	4.71	25.82	192.63	457.84	183.14	101.75
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	104.26	104.26	4.71	25.82	192.63	483.66	193.46	110.63
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	104.26	104.26	4.71	25.82	192.63	509.48	203.79	119.50
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	104.26	104.26	4.71	25.82	192.63	535.30	214.12	128.38
19	29.50	30.00	0.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	104.26	104.26	1.57	8.61	192.63	543.90	217.56	131.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	0.72	2.05	1.85	7.15	6.43	0.209	0.837	9.56	2.39	34.18	15.35	22.94	5.73	82.04	36.84
2	22.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	0.73	2.05	1.85	7.08	6.36	0.203	0.811	9.86	2.46	34.90	15.68	23.66	5.92	83.77	37.63
3	24.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-54	-
Chainage	5+939	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	136.34	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-54	1.20	22.00	19.50	19.50	261.72	116.83	12.52	3.13
BH-54	1.20	23.50	21.00	21.00	277.92	130.55	12.91	3.23
BH-54	1.20	25.00	22.50	22.50	294.13	144.27	13.30	3.32
BH-54	1.20	26.50	24.00	24.00	310.34	157.98	13.68	3.42
BH-54	1.20	28.00	25.50	25.50	326.54	171.70	13.68	3.42
BH-54	1.20	29.50	27.00	27.00	342.75	185.42	14.06	3.51
BH-54	1.20	30.00	27.50	27.50	348.15	190.00	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	3.25	4.00	6.41	12.82	5.65	1.65	26.11	27.76	11.10	6.80
2	4.00	5.50	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	4.75	5.50	19.22	25.63	5.65	4.95	45.30	51.90	20.76	10.56
3	5.50	7.00	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	6.25	7.00	32.04	38.45	5.65	8.25	64.49	79.34	31.74	15.24
4	7.00	8.50	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	7.75	8.50	44.85	51.26	5.65	11.55	83.68	110.08	44.03	20.85
5	8.50	10.00	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	57.67	64.08	5.65	14.85	102.87	144.12	57.65	27.38
6	10.00	11.50	1.50	Granular	8.54	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	70.48	76.89	5.65	18.15	122.06	181.46	72.58	34.84
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	83.73	90.58	5.65	23.22	192.92	275.54	110.22	43.72
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	97.42	104.26	5.65	27.02	220.59	330.24	132.09	53.66
9	14.50	16.00	1.50	Granular	10.69	0.03	27	-	13.80	15.50	1.00	-	15.25	16.00	112.28	120.30	5.65	30.03	221.75	361.43	144.57	64.44
10	16.00	17.50	1.50	Granular	10.69	0.03	27	-	13.80	15.50	1.00	-	16.75	17.50	128.32	136.34	5.65	34.32	249.98	423.97	169.59	76.43
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	136.34	136.34	5.65	39.16	324.30	537.46	214.98	89.77
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	136.34	136.34	5.65	39.16	324.30	576.62	230.65	103.11
13	20.50	22.00	1.50	Granular	10.69	0.09	30	-	19.50	22.44	1.00	-	21.25	22.00	136.34	136.34	5.65	40.51	361.46	654.30	261.72	116.83
14	22.00	23.50	1.50	Granular	10.69	0.09	30	-	19.50	22.44	1.00	-	22.75	23.50	136.34	136.34	5.65	40.51	361.46	694.81	277.92	130.55
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	136.34	136.34	5.65	40.51	361.46	735.33	294.13	144.27
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	136.34	136.34	5.65	40.51	361.46	775.84	310.34	157.98
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	136.34	136.34	5.65	40.51	361.46	816.35	326.54	171.70
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	136.34	136.34	5.65	40.51	361.46	856.87	342.75	185.42
19	29.50	30.00	0.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	136.34	136.34	1.88	13.50	361.46	870.37	348.15	190.00

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.62	2.07	1.85	8.34	7.45	0.160	0.639	12.52	3.13	52.18	23.32	30.04	7.51	125.23	55.97
2	22.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	0.63	2.07	1.85	8.25	7.38	0.155	0.620	12.91	3.23	53.27	23.82	30.99	7.75	127.85	57.16
3	24.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-55	-
Chainage	6+004	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	108.36	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-55	1.00	22.00	19.50	18.00	169.19	86.66	10.73	2.68
BH-55	1.00	23.50	21.00	19.50	179.92	95.82	11.06	2.77
BH-55	1.00	25.00	22.50	21.00	190.66	104.98	11.38	2.85
BH-55	1.00	26.50	24.00	22.50	201.39	114.15	11.38	2.85
BH-55	1.00	28.00	25.50	24.00	212.12	123.31	11.70	2.93
BH-55	1.00	29.50	27.00	25.50	222.85	132.47	12.01	3.00
BH-55	1.00	30.00	27.50	26.00	226.43	135.52	12.01	3.00

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.54	0.20	21	-	2.00	6.49	1.00	-	3.25	4.00	6.41	12.82	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	4.75	5.50	19.22	25.63	4.71	4.13	30.66	34.78	13.91	7.20
3	5.50	7.00	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	32.04	38.45	4.71	6.88	43.98	54.98	21.99	10.78
4	7.00	8.50	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	44.85	51.26	4.71	9.63	57.31	77.94	31.17	15.12
5	8.50	10.00	1.50	Granular	9.12	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	58.10	64.95	4.71	12.95	84.33	117.91	47.16	20.40
6	10.00	11.50	1.50	Granular	9.12	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	71.79	78.63	4.71	16.00	101.05	150.63	60.25	26.53
7	11.50	13.00	1.50	Granular	9.12	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	85.47	92.32	4.71	19.75	135.28	204.61	81.85	33.71
8	13.00	14.50	1.50	Granular	10.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	100.34	108.36	4.71	23.19	158.78	251.30	100.52	41.85
9	14.50	16.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	108.36	108.36	4.71	25.94	179.33	297.78	119.11	50.76
10	16.00	17.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	108.36	108.36	4.71	25.94	179.33	323.72	129.49	59.67
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	108.36	108.36	4.71	25.94	179.33	349.66	139.86	68.58
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	108.36	108.36	4.71	25.94	179.33	375.60	150.24	77.50
13	20.50	22.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	21.25	22.00	108.36	108.36	4.71	26.83	199.87	422.97	169.19	86.66
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	108.36	108.36	4.71	26.83	199.87	449.81	179.92	95.82
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	108.36	108.36	4.71	26.83	199.87	476.64	190.66	104.98
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	108.36	108.36	4.71	26.83	199.87	503.47	201.39	114.15
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	108.36	108.36	4.71	26.83	199.87	530.30	212.12	123.31
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	108.36	108.36	4.71	26.83	199.87	557.13	222.85	132.47
19	29.50	30.00	0.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	108.36	108.36	1.57	8.94	199.87	566.08	226.43	135.52

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
6	28.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	30.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-55	-
Chainage	6+004	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	140.44	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-55	1.20	22.00	19.50	18.00	270.72	120.21	13.97	3.49
BH-55	1.20	23.50	21.00	19.50	287.41	134.27	14.39	3.60
BH-55	1.20	25.00	22.50	21.00	304.10	148.32	14.81	3.70
BH-55	1.20	26.50	24.00	22.50	320.79	162.38	14.81	3.70
BH-55	1.20	28.00	25.50	24.00	337.49	176.44	15.22	3.81
BH-55	1.20	29.50	27.00	25.50	354.18	190.50	15.63	3.91
BH-55	1.20	30.00	27.50	26.00	359.74	195.19	15.63	3.91

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α_i)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.54	0.20	21	-	2.00	6.49	1.00	-	3.25	4.00	6.41	12.82	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	4.75	5.50	19.22	25.63	5.65	4.95	45.30	50.25	20.10	10.09
3	5.50	7.00	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	32.04	38.45	5.65	8.25	64.49	77.69	31.08	14.78
4	7.00	8.50	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	44.85	51.26	5.65	11.55	83.68	108.43	43.37	20.39
5	8.50	10.00	1.50	Granular	9.12	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	58.10	64.95	5.65	15.54	122.86	163.15	65.26	27.12
6	10.00	11.50	1.50	Granular	9.12	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	71.79	78.63	5.65	19.20	146.95	206.44	82.57	34.87
7	11.50	13.00	1.50	Granular	9.12	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	85.47	92.32	5.65	23.71	196.43	279.63	111.85	43.88
8	13.00	14.50	1.50	Granular	10.69	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	100.34	108.36	5.65	27.83	230.55	341.57	136.63	54.05
9	14.50	16.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	116.38	124.40	5.65	33.43	297.01	441.46	176.59	65.78
10	16.00	17.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	132.42	140.44	5.65	38.04	333.66	516.15	206.46	78.81
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	140.44	140.44	5.65	40.34	333.66	556.49	222.59	92.48
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	140.44	140.44	5.65	40.34	333.66	596.83	238.73	106.15
13	20.50	22.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	21.25	22.00	140.44	140.44	5.65	41.73	371.90	676.79	270.72	120.21
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	140.44	140.44	5.65	41.73	371.90	718.52	287.41	134.27
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	140.44	140.44	5.65	41.73	371.90	760.25	304.10	148.32
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	140.44	140.44	5.65	41.73	371.90	801.99	320.79	162.38
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	140.44	140.44	5.65	41.73	371.90	843.72	337.49	176.44
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	140.44	140.44	5.65	41.73	371.90	885.45	354.18	190.50
19	29.50	30.00	0.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	140.44	140.44	1.88	13.91	371.90	899.36	359.74	195.19

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
6	28.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	30.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-56	-
Chainage	6+182	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	97.30	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-56	1.00	22.00	19.50	16.50	131.78	76.46	10.73	2.68
BH-56	1.00	23.50	21.00	18.00	140.97	84.41	10.73	2.68
BH-56	1.00	25.00	22.50	19.50	165.43	92.80	11.10	2.77
BH-56	1.00	26.50	24.00	21.00	175.07	101.20	11.10	2.77
BH-56	1.00	28.00	25.50	22.50	184.46	109.59	11.45	2.86
BH-56	1.00	29.50	27.00	24.00	194.10	117.99	11.80	2.95
BH-56	1.00	30.00	27.50	24.50	197.31	120.79	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α_i)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	5.49	0.02	21	-	2.00	6.49	1.00	-	3.25	4.00	4.12	8.24	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	5.49	0.02	21	-	2.00	6.49	1.00	-	4.75	5.50	12.36	16.48	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	8.69	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	23.00	29.52	4.71	4.56	25.50	30.06	12.02	8.97
4	7.00	8.50	1.50	Granular	8.69	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	36.04	42.56	4.71	7.14	35.56	47.25	18.90	12.62
5	8.50	10.00	1.50	Granular	9.12	0.07	24	-	8.00	9.78	1.00	-	9.25	10.00	49.40	56.25	4.71	9.79	46.24	67.73	27.09	17.01
6	10.00	11.50	1.50	Granular	9.12	0.07	24	-	8.00	9.78	1.00	-	10.75	11.50	63.09	69.93	4.71	12.50	56.80	90.78	36.31	22.16
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	76.77	83.62	4.71	17.74	123.07	174.79	69.92	28.78
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	90.46	97.30	4.71	20.91	142.28	214.91	85.97	36.28
9	14.50	16.00	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	97.30	97.30	4.71	23.29	160.70	256.62	102.65	44.45
10	16.00	17.50	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	97.30	97.30	4.71	23.29	160.70	279.91	111.96	52.62
11	17.50	19.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	97.30	97.30	4.71	22.49	142.76	284.46	113.78	60.57
12	19.00	20.50	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	97.30	97.30	4.71	22.49	142.76	306.95	122.78	68.51
13	20.50	22.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	97.30	97.30	4.71	22.49	142.76	329.44	131.78	76.46
14	22.00	23.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	97.30	97.30	4.71	22.49	143.26	352.42	140.97	84.41
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	97.30	97.30	4.71	24.09	180.32	413.58	165.43	92.80
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	97.30	97.30	4.71	24.09	180.32	437.67	175.07	101.20
17	26.50	28.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	97.30	97.30	4.71	24.09	179.71	461.15	184.46	109.59
18	28.00	29.50	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	97.30	97.30	4.71	24.09	179.71	485.25	194.10	117.99
19	29.50	30.00	0.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	97.30	97.30	1.57	8.03	179.71	493.28	197.31	120.79

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
3	24.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
5	27.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
6	28.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-56	-
Chainage	6+182	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	155.12	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-56	1.20	22.00	19.50	16.50	245.98	116.23	13.94	3.49
BH-56	1.20	23.50	21.00	18.00	263.53	130.65	13.94	3.49
BH-56	1.20	25.00	22.50	19.50	315.64	145.93	14.41	3.60
BH-56	1.20	26.50	24.00	21.00	334.08	161.21	14.41	3.60
BH-56	1.20	28.00	25.50	22.50	352.09	176.49	14.88	3.72
BH-56	1.20	29.50	27.00	24.00	370.53	191.78	15.33	3.83
BH-56	1.20	30.00	27.50	24.50	376.68	196.87	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α_i)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	5.49	0.02	21	-	2.00	6.49	1.00	-	3.25	4.00	4.12	8.24	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	5.49	0.02	21	-	2.00	6.49	1.00	-	4.75	5.50	12.36	16.48	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	8.69	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	23.00	29.52	5.65	5.47	37.51	42.98	17.19	12.61
4	7.00	8.50	1.50	Granular	8.69	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	36.04	42.56	5.65	8.57	51.99	66.03	26.41	17.39
5	8.50	10.00	1.50	Granular	9.12	0.07	24	-	8.00	9.78	1.00	-	9.25	10.00	49.40	56.25	5.65	11.74	67.42	93.20	37.28	23.05
6	10.00	11.50	1.50	Granular	9.12	0.07	24	-	8.00	9.78	1.00	-	10.75	11.50	63.09	69.93	5.65	15.00	82.61	123.39	49.36	29.63
7	11.50	13.00	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	76.77	83.62	5.65	21.29	178.84	240.91	96.36	37.96
8	13.00	14.50	1.50	Granular	9.12	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	90.46	97.30	5.65	25.09	206.51	293.67	117.47	47.36
9	14.50	16.00	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	104.14	110.99	5.65	29.91	264.49	381.57	152.63	58.11
10	16.00	17.50	1.50	Granular	9.12	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	155.12	155.12	5.65	44.56	365.33	526.96	210.78	72.97
11	17.50	19.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	155.12	155.12	5.65	43.02	324.26	528.91	211.57	87.39
12	19.00	20.50	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	155.12	155.12	5.65	43.02	324.26	571.93	228.77	101.81
13	20.50	22.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	155.12	155.12	5.65	43.02	324.26	614.96	245.98	116.23
14	22.00	23.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	155.12	155.12	5.65	43.02	325.12	658.83	263.53	130.65
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	155.12	155.12	5.65	46.09	409.30	789.11	315.64	145.93
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	155.12	155.12	5.65	46.09	409.30	835.20	334.08	161.21
17	26.50	28.00	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	155.12	155.12	5.65	46.09	408.24	880.24	352.09	176.49
18	28.00	29.50	1.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	155.12	155.12	5.65	46.09	408.24	926.33	370.53	191.78
19	29.50	30.00	0.50	Granular	9.89	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	155.12	155.12	1.88	15.36	408.24	941.69	376.68	196.87

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
3	24.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
5	27.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
6	28.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-57	-
Chainage	6+246	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	114.19	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-57	1.00	20.50	18.00	18.00	156.73	79.45	10.45	2.61
BH-57	1.00	22.00	19.50	19.50	167.66	88.75	11.02	2.76
BH-57	1.00	23.50	21.00	21.00	187.62	98.32	11.30	2.83
BH-57	1.00	25.00	22.50	22.50	198.93	107.88	11.58	2.89
BH-57	1.00	26.50	24.00	24.00	210.24	117.45	11.85	2.96
BH-57	1.00	28.00	25.50	25.50	221.55	127.02	12.12	3.03
BH-57	1.00	29.50	27.00	27.00	232.86	136.59	12.12	3.03
BH-57	1.00	31.00	28.50	28.50	244.17	146.15	12.39	3.10
BH-57	1.00	32.50	30.00	30.00	255.48	155.72	12.39	3.10
BH-57	1.00	34.00	31.50	31.50	266.79	165.29	12.39	3.10
BH-57	1.00	35.00	32.50	32.50	274.33	171.66	12.39	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.12	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.84	13.69	4.71	1.24	9.62	10.86	4.35	4.75
2	4.00	5.50	1.50	Granular	9.12	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	20.53	27.37	4.71	3.73	17.80	22.77	9.11	7.44
3	5.50	7.00	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	34.21	41.06	4.71	7.06	38.80	50.83	20.33	11.07
4	7.00	8.50	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	47.90	54.74	4.71	9.88	50.54	72.45	28.98	15.48
5	8.50	10.00	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	61.58	68.43	4.71	12.71	62.28	96.90	38.76	20.69
6	10.00	11.50	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	75.27	82.11	4.71	15.53	74.01	124.17	49.67	26.69
7	11.50	13.00	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	90.13	98.15	4.71	20.09	125.76	196.00	78.40	33.96
8	13.00	14.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	106.17	114.19	4.71	23.66	145.36	239.27	95.71	42.24
9	14.50	16.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	114.19	114.19	4.71	27.33	188.58	309.82	123.93	51.54
10	16.00	17.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	114.19	114.19	4.71	27.33	188.58	337.16	134.86	60.84
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	114.19	114.19	4.71	27.33	188.58	364.49	145.80	70.15
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	114.19	114.19	4.71	27.33	188.58	391.82	156.73	79.45
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	114.19	114.19	4.71	27.33	188.58	419.16	167.66	88.75
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	114.19	114.19	4.71	28.28	210.20	469.05	187.62	98.32
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	114.19	114.19	4.71	28.28	210.20	497.32	198.93	107.88
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	114.19	114.19	4.71	28.28	210.20	525.60	210.24	117.45
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	114.19	114.19	4.71	28.28	210.20	553.88	221.55	127.02
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	114.19	114.19	4.71	28.28	210.20	582.15	232.86	136.59
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	114.19	114.19	4.71	28.28	210.20	610.43	244.17	146.15
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	114.19	114.19	4.71	28.28	210.20	638.71	255.48	155.72
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	114.19	114.19	4.71	28.28	210.20	666.98	266.79	165.29
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	114.19	114.19	3.14	18.85	210.20	685.83	274.33	171.66

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
2	22.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
6	28.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	29.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	31.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	32.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	34.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	35.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-57	-
Chainage	6+246	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	146.27	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-57	1.20	20.50	18.00	18.00	247.41	108.49	13.68	3.42
BH-57	1.20	22.00	19.50	19.50	264.21	122.63	14.43	3.61
BH-57	1.20	23.50	21.00	21.00	297.51	137.17	14.79	3.70
BH-57	1.20	25.00	22.50	22.50	314.89	151.72	15.15	3.79
BH-57	1.20	26.50	24.00	24.00	332.28	166.26	15.51	3.88
BH-57	1.20	28.00	25.50	25.50	349.67	180.81	15.86	3.96
BH-57	1.20	29.50	27.00	27.00	367.05	195.35	15.86	3.96
BH-57	1.20	31.00	28.50	28.50	384.44	209.90	16.20	4.05
BH-57	1.20	32.50	30.00	30.00	401.82	224.44	16.20	4.05
BH-57	1.20	34.00	31.50	31.50	419.21	238.99	16.20	4.05
BH-57	1.20	35.00	32.50	32.50	430.80	248.69	16.20	4.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.12	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.84	13.69	5.65	1.49	14.27	15.76	6.30	6.75
2	4.00	5.50	1.50	Granular	9.12	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	20.53	27.37	5.65	4.47	26.05	32.02	12.81	10.38
3	5.50	7.00	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	34.21	41.06	5.65	8.47	56.91	71.35	28.54	15.13
4	7.00	8.50	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	47.90	54.74	5.65	11.86	73.81	100.11	40.04	20.82
5	8.50	10.00	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	9.25	10.00	61.58	68.43	5.65	15.25	90.71	132.26	52.90	27.47
6	10.00	11.50	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	10.75	11.50	75.27	82.11	5.65	18.64	107.61	167.80	67.12	35.06
7	11.50	13.00	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	90.13	98.15	5.65	24.10	182.77	267.06	106.82	44.18
8	13.00	14.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	106.17	114.19	5.65	28.39	211.00	323.68	129.47	54.51
9	14.50	16.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	122.21	130.23	5.65	35.10	310.34	458.13	183.25	66.71
10	16.00	17.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	138.25	146.27	5.65	39.71	346.99	534.49	213.80	80.21
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	146.27	146.27	5.65	42.02	346.99	576.51	230.60	94.35
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	146.27	146.27	5.65	42.02	346.99	618.52	247.41	108.49
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	146.27	146.27	5.65	42.02	346.99	660.54	264.21	122.63
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	146.27	146.27	5.65	43.46	386.76	743.77	297.51	137.17
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	146.27	146.27	5.65	43.46	386.76	787.23	314.89	151.72
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	146.27	146.27	5.65	43.46	386.76	830.70	332.28	166.26
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	146.27	146.27	5.65	43.46	386.76	874.16	349.67	180.81
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	146.27	146.27	5.65	43.46	386.76	917.63	367.05	195.35
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	146.27	146.27	5.65	43.46	386.76	961.09	384.44	209.90
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	146.27	146.27	5.65	43.46	386.76	1004.56	401.82	224.44
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	146.27	146.27	5.65	43.46	386.76	1048.02	419.21	238.99
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	146.27	146.27	3.77	28.98	386.76	1077.00	430.80	248.69

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
2	22.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
6	28.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	29.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	31.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	32.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	34.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	35.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-58	-
Chainage	6+323	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	114.10	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-58	1.00	20.50	18.00	18.00	146.50	78.52	10.45	2.61
BH-58	1.00	22.00	19.50	19.50	157.05	87.55	11.30	2.83
BH-58	1.00	23.50	21.00	21.00	167.60	96.58	11.58	2.89
BH-58	1.00	25.00	22.50	22.50	196.13	106.14	11.58	2.89
BH-58	1.00	26.50	24.00	24.00	207.68	115.70	11.85	2.96
BH-58	1.00	28.00	25.50	25.50	218.98	125.26	11.85	2.96
BH-58	1.00	29.50	27.00	27.00	230.28	134.82	12.12	3.03
BH-58	1.00	31.00	28.50	28.50	241.58	144.38	12.12	3.03
BH-58	1.00	32.50	30.00	30.00	252.88	153.94	12.12	3.03
BH-58	1.00	34.00	31.50	31.50	264.19	163.51	12.12	3.03
BH-58	1.00	35.00	32.50	32.50	271.72	169.88	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.12	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	6.84	13.69	4.71	1.30	11.52	12.82	5.13	4.76
2	4.00	5.50	1.50	Granular	9.12	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	20.53	27.37	4.71	3.90	20.89	26.09	10.44	7.50
3	5.50	7.00	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	34.21	41.06	4.71	7.06	38.80	51.06	20.42	11.13
4	7.00	8.50	1.50	Granular	9.89	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	48.48	55.90	4.71	10.00	51.83	74.09	29.64	15.58
5	8.50	10.00	1.50	Granular	9.89	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	63.32	70.74	4.71	13.59	78.19	114.04	45.62	21.03
6	10.00	11.50	1.50	Granular	9.89	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	78.16	85.58	4.71	16.77	93.62	146.24	58.50	27.38
7	11.50	13.00	1.50	Granular	9.89	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	93.00	100.42	4.71	20.73	128.09	201.44	80.58	34.83
8	13.00	14.50	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	107.26	114.10	4.71	23.90	144.40	241.65	96.66	43.17
9	14.50	16.00	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	114.10	114.10	4.71	25.43	144.40	267.08	106.83	51.94
10	16.00	17.50	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	114.10	114.10	4.71	25.43	144.40	292.51	117.00	60.71
11	17.50	19.00	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	114.10	114.10	4.71	25.43	144.40	317.94	127.17	69.48
12	19.00	20.50	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	114.10	114.10	4.71	26.37	166.35	366.26	146.50	78.52
13	20.50	22.00	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	114.10	114.10	4.71	26.37	166.35	392.63	157.05	87.55
14	22.00	23.50	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	114.10	114.10	4.71	26.37	166.35	419.00	167.60	96.58
15	23.50	25.00	1.50	Granular	9.89	0.10	30	-	19.50	22.44	1.00	-	24.25	25.00	114.10	114.10	4.71	28.25	209.42	490.32	196.13	106.14
16	25.00	26.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	25.75	26.50	114.10	114.10	4.71	28.25	210.04	519.19	207.68	115.70
17	26.50	28.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	27.25	28.00	114.10	114.10	4.71	28.25	210.04	547.45	218.98	125.26
18	28.00	29.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	28.75	29.50	114.10	114.10	4.71	28.25	210.04	575.70	230.28	134.82
19	29.50	31.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	30.25	31.00	114.10	114.10	4.71	28.25	210.04	603.96	241.58	144.38
20	31.00	32.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	31.75	32.50	114.10	114.10	4.71	28.25	210.04	632.21	252.88	153.94
21	32.50	34.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	33.25	34.00	114.10	114.10	4.71	28.25	210.04	660.47	264.19	163.51
22	34.00	35.00	1.00	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	34.50	35.00	114.10	114.10	3.14	18.84	210.04	679.30	271.72	169.88

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
2	22.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
3	23.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	29.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	31.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
7	35.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-58	-
Chainage	6+323	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	141.47	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-58	1.20	20.50	18.00	18.00	223.51	105.85	13.68	3.42
BH-58	1.20	22.00	19.50	19.50	239.21	119.21	14.79	3.70
BH-58	1.20	23.50	21.00	21.00	254.90	132.57	15.15	3.79
BH-58	1.20	25.00	22.50	22.50	302.44	146.72	15.15	3.79
BH-58	1.20	26.50	24.00	24.00	319.68	160.87	15.51	3.88
BH-58	1.20	28.00	25.50	25.50	336.50	175.01	15.51	3.88
BH-58	1.20	29.50	27.00	27.00	353.31	189.16	15.86	3.96
BH-58	1.20	31.00	28.50	28.50	370.13	203.30	15.86	3.96
BH-58	1.20	32.50	30.00	30.00	386.94	217.45	15.86	3.96
BH-58	1.20	34.00	31.50	31.50	403.76	231.60	15.86	3.96
BH-58	1.20	35.00	32.50	32.50	414.97	241.03	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.12	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	6.84	13.69	5.65	1.56	17.22	18.78	7.51	6.77
2	4.00	5.50	1.50	Granular	9.12	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	20.53	27.37	5.65	4.68	30.71	36.94	14.78	10.45
3	5.50	7.00	1.50	Granular	9.12	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	34.21	41.06	5.65	8.47	56.91	71.62	28.65	15.20
4	7.00	8.50	1.50	Granular	9.89	0.05	25	-	10.00	10.88	1.00	-	7.75	8.50	48.48	55.90	5.65	12.00	75.76	102.48	40.99	20.94
5	8.50	10.00	1.50	Granular	9.89	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	63.32	70.74	5.65	16.31	113.93	156.95	62.78	27.88
6	10.00	11.50	1.50	Granular	9.89	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	78.16	85.58	5.65	20.13	136.15	199.30	79.72	35.89
7	11.50	13.00	1.50	Granular	9.89	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	93.00	100.42	5.65	24.87	186.01	274.02	109.61	45.23
8	13.00	14.50	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	107.26	114.10	5.65	28.68	209.36	326.06	130.43	55.63
9	14.50	16.00	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	120.94	127.79	5.65	32.34	233.45	382.49	153.00	67.07
10	16.00	17.50	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	134.63	141.47	5.65	36.00	257.53	442.58	177.03	79.52
11	17.50	19.00	1.50	Granular	9.12	0.08	27	-	13.80	15.50	1.00	-	18.25	19.00	141.47	141.47	5.65	37.83	257.53	480.41	192.17	92.49
12	19.00	20.50	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	141.47	141.47	5.65	39.24	296.66	558.78	223.51	105.85
13	20.50	22.00	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	141.47	141.47	5.65	39.24	296.66	598.01	239.21	119.21
14	22.00	23.50	1.50	Granular	9.89	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	141.47	141.47	5.65	39.24	296.66	637.25	254.90	132.57
15	23.50	25.00	1.50	Granular	9.89	0.10	30	-	19.50	22.44	1.00	-	24.25	25.00	141.47	141.47	5.65	42.04	373.47	756.10	302.44	146.72
16	25.00	26.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	25.75	26.50	141.47	141.47	5.65	42.04	374.53	799.20	319.68	160.87
17	26.50	28.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	27.25	28.00	141.47	141.47	5.65	42.04	374.53	841.24	336.50	175.01
18	28.00	29.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	28.75	29.50	141.47	141.47	5.65	42.04	374.53	883.28	353.31	189.16
19	29.50	31.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	30.25	31.00	141.47	141.47	5.65	42.04	374.53	925.32	370.13	203.30
20	31.00	32.50	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	31.75	32.50	141.47	141.47	5.65	42.04	374.53	967.35	386.94	217.45
21	32.50	34.00	1.50	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	33.25	34.00	141.47	141.47	5.65	42.04	374.53	1009.39	403.76	231.60
22	34.00	35.00	1.00	Granular	10.69	0.10	30	-	19.50	22.44	1.00	-	34.50	35.00	141.47	141.47	3.77	28.03	374.53	1037.42	414.97	241.03

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
2	22.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
3	23.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	29.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	31.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
7	35.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-59	-
Chainage	6+429	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	113.85	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-59	1.00	20.50	18.00	18.00	156.90	79.72	11.58	2.89
BH-59	1.00	22.00	19.50	19.50	167.80	89.00	12.12	3.03
BH-59	1.00	23.50	21.00	21.00	178.70	98.28	12.39	3.10
BH-59	1.00	25.00	22.50	22.50	198.60	107.82	12.39	3.10
BH-59	1.00	26.50	24.00	24.00	209.87	117.37	12.39	3.10
BH-59	1.00	28.00	25.50	25.50	221.15	126.91	12.65	3.16
BH-59	1.00	29.50	27.00	27.00	232.43	136.45	12.65	3.16
BH-59	1.00	31.00	28.50	28.50	243.70	145.99	12.65	3.16
BH-59	1.00	32.50	30.00	30.00	254.98	155.54	12.65	3.16
BH-59	1.00	34.00	31.50	31.50	266.26	165.08	12.65	3.16
BH-59	1.00	35.00	32.50	32.50	273.77	171.44	12.65	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.54	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.41	12.82	4.71	1.16	9.01	10.17	4.07	4.72
2	4.00	5.50	1.50	Granular	8.54	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	19.22	25.63	4.71	3.49	16.67	21.33	8.53	7.35
3	5.50	7.00	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	32.04	38.45	4.71	6.88	43.98	55.51	22.21	10.93
4	7.00	8.50	1.50	Granular	9.89	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	45.87	53.29	4.71	9.84	60.05	81.42	32.57	15.33
5	8.50	10.00	1.50	Granular	9.89	0.09	27	-	13.80	15.50	1.00	-	9.25	10.00	60.71	68.13	4.71	13.53	88.63	123.54	49.41	20.77
6	10.00	11.50	1.50	Granular	9.89	0.09	27	-	13.80	15.50	1.00	-	10.75	11.50	75.55	82.97	4.71	16.84	106.77	158.51	63.40	27.13
7	11.50	13.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	12.25	13.00	90.39	97.81	4.71	20.89	143.47	216.10	86.44	34.63
8	13.00	14.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	13.75	14.50	105.83	113.85	4.71	24.46	166.49	263.58	105.43	43.13
9	14.50	16.00	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	15.25	16.00	113.85	113.85	4.71	26.31	166.49	289.89	115.96	52.14
10	16.00	17.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	16.75	17.50	113.85	113.85	4.71	26.31	166.49	316.20	126.48	61.16
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	113.85	113.85	4.71	27.25	188.04	365.00	146.00	70.44
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	113.85	113.85	4.71	27.25	188.04	392.25	156.90	79.72
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	113.85	113.85	4.71	27.25	188.04	419.50	167.80	89.00
14	22.00	23.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	113.85	113.85	4.71	27.25	188.04	446.75	178.70	98.28
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	113.85	113.85	4.71	28.19	209.58	496.49	198.60	107.82
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	113.85	113.85	4.71	28.19	209.58	524.68	209.87	117.37
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	113.85	113.85	4.71	28.19	209.58	552.88	221.15	126.91
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	113.85	113.85	4.71	28.19	209.58	581.07	232.43	136.45
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	113.85	113.85	4.71	28.19	209.58	609.26	243.70	145.99
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	113.85	113.85	4.71	28.19	209.58	637.45	254.98	155.54
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	113.85	113.85	4.71	28.19	209.58	665.64	266.26	165.08
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	113.85	113.85	3.14	18.79	209.58	684.44	273.77	171.44

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	31.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	32.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	34.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	35.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-59	-
Chainage	6+429	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	145.93	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-59	1.20	20.50	18.00	18.00	247.43	108.73	15.15	3.79
BH-59	1.20	22.00	19.50	19.50	264.20	122.84	15.86	3.96
BH-59	1.20	23.50	21.00	21.00	280.97	136.95	16.20	4.05
BH-59	1.20	25.00	22.50	22.50	314.18	151.47	16.20	4.05
BH-59	1.20	26.50	24.00	24.00	331.53	165.98	16.20	4.05
BH-59	1.20	28.00	25.50	25.50	348.87	180.50	16.54	4.14
BH-59	1.20	29.50	27.00	27.00	366.22	195.02	16.54	4.14
BH-59	1.20	31.00	28.50	28.50	383.56	209.53	16.54	4.14
BH-59	1.20	32.50	30.00	30.00	400.91	224.05	16.54	4.14
BH-59	1.20	34.00	31.50	31.50	418.25	238.57	16.54	4.14
BH-59	1.20	35.00	32.50	32.50	429.82	248.24	16.54	4.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.54	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.41	12.82	5.65	1.40	13.36	14.76	5.90	6.72
2	4.00	5.50	1.50	Granular	8.54	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	19.22	25.63	5.65	4.19	24.40	29.98	11.99	10.27
3	5.50	7.00	1.50	Granular	8.54	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	32.04	38.45	5.65	8.25	64.49	78.33	31.33	14.96
4	7.00	8.50	1.50	Granular	9.89	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	45.87	53.29	5.65	11.81	87.80	113.45	45.38	20.64
5	8.50	10.00	1.50	Granular	9.89	0.09	27	-	13.80	15.50	1.00	-	9.25	10.00	60.71	68.13	5.65	16.23	129.18	171.07	68.43	27.56
6	10.00	11.50	1.50	Granular	9.89	0.09	27	-	13.80	15.50	1.00	-	10.75	11.50	75.55	82.97	5.65	20.20	155.30	217.38	86.95	35.59
7	11.50	13.00	1.50	Granular	9.89	0.10	28	-	15.70	17.82	1.00	-	12.25	13.00	90.39	97.81	5.65	25.07	208.36	295.51	118.21	44.99
8	13.00	14.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	13.75	14.50	105.83	113.85	5.65	29.35	241.65	358.15	143.26	55.58
9	14.50	16.00	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	15.25	16.00	121.87	129.89	5.65	33.80	274.09	424.39	169.76	67.42
10	16.00	17.50	1.50	Granular	10.69	0.10	28	-	15.70	17.82	1.00	-	16.75	17.50	137.91	145.93	5.65	38.25	306.52	495.07	198.03	80.50
11	17.50	19.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	145.93	145.93	5.65	41.92	346.20	576.67	230.67	94.61
12	19.00	20.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	145.93	145.93	5.65	41.92	346.20	618.58	247.43	108.73
13	20.50	22.00	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	145.93	145.93	5.65	41.92	346.20	660.50	264.20	122.84
14	22.00	23.50	1.50	Granular	10.69	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	145.93	145.93	5.65	41.92	346.20	702.42	280.97	136.95
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	145.93	145.93	5.65	43.36	385.88	785.46	314.18	151.47
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	145.93	145.93	5.65	43.36	385.88	828.82	331.53	165.98
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	145.93	145.93	5.65	43.36	385.88	872.18	348.87	180.50
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	145.93	145.93	5.65	43.36	385.88	915.54	366.22	195.02
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	145.93	145.93	5.65	43.36	385.88	958.91	383.56	209.53
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	145.93	145.93	5.65	43.36	385.88	1002.27	400.91	224.05
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	145.93	145.93	5.65	43.36	385.88	1045.63	418.25	238.57
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	145.93	145.93	3.77	28.91	385.88	1074.54	429.82	248.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	31.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	32.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	34.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	35.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-60	-
Chainage	6+488	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.46	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-60	1.00	20.50	18.00	18.00	151.70	77.59	10.74	2.68
BH-60	1.00	22.00	19.50	19.50	162.28	86.64	11.02	2.76
BH-60	1.00	23.50	21.00	21.00	181.59	95.95	11.30	2.83
BH-60	1.00	25.00	22.50	22.50	192.53	105.26	11.30	2.83
BH-60	1.00	26.50	24.00	24.00	203.47	114.56	11.58	2.89
BH-60	1.00	28.00	25.50	25.50	214.41	123.87	11.58	2.89
BH-60	1.00	29.50	27.00	27.00	225.35	133.18	11.85	2.96
BH-60	1.00	31.00	28.50	28.50	236.29	142.49	11.85	2.96
BH-60	1.00	32.50	30.00	30.00	247.24	151.80	11.85	2.96
BH-60	1.00	34.00	31.50	31.50	258.18	161.10	11.85	2.96
BH-60	1.00	35.00	32.50	32.50	265.47	167.31	11.85	2.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.12	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.84	13.69	4.71	1.24	9.62	10.86	4.35	4.75
2	4.00	5.50	1.50	Granular	9.12	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	20.53	27.37	4.71	3.73	17.80	22.77	9.11	7.44
3	5.50	7.00	1.50	Granular	9.12	0.06	24	-	8.00	9.78	1.00	-	6.25	7.00	34.21	41.06	4.71	6.78	34.53	46.28	18.51	10.99
4	7.00	8.50	1.50	Granular	8.89	0.06	24	-	8.00	9.78	1.00	-	7.75	8.50	47.73	54.40	4.71	9.45	44.74	65.95	26.38	15.28
5	8.50	10.00	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	61.07	67.74	4.71	13.11	74.60	108.91	43.56	20.60
6	10.00	11.50	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	74.41	81.08	4.71	15.97	88.48	138.75	55.50	26.72
7	11.50	13.00	1.50	Granular	8.89	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	87.75	94.42	4.71	19.56	120.22	190.05	76.02	33.85
8	13.00	14.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	102.44	110.46	4.71	22.83	140.80	233.46	93.38	41.89
9	14.50	16.00	1.50	Granular	10.69	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	110.46	110.46	4.71	25.53	161.73	279.92	111.97	50.69
10	16.00	17.50	1.50	Granular	10.69	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	110.46	110.46	4.71	25.53	161.73	305.45	122.18	59.48
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	110.46	110.46	4.71	26.44	182.66	352.82	141.13	68.54
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	110.46	110.46	4.71	26.44	182.66	379.26	151.70	77.59
13	20.50	22.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	21.25	22.00	110.46	110.46	4.71	26.44	182.66	405.70	162.28	86.64
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	110.46	110.46	4.71	27.35	203.59	453.98	181.59	95.95
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	110.46	110.46	4.71	27.35	203.59	481.33	192.53	105.26
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	110.46	110.46	4.71	27.35	203.59	508.68	203.47	114.56
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	110.46	110.46	4.71	27.35	203.59	536.03	214.41	123.87
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	110.46	110.46	4.71	27.35	203.59	563.39	225.35	133.18
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	110.46	110.46	4.71	27.35	203.59	590.74	236.29	142.49
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	110.46	110.46	4.71	27.35	203.59	618.09	247.24	151.80
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	110.46	110.46	4.71	27.35	203.59	645.44	258.18	161.10
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	110.46	110.46	3.14	18.23	203.59	663.68	265.47	167.31

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
2	22.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
4	25.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
5	26.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
6	28.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	0.76	2.05	1.84	6.71	6.04	0.173	0.691	11.58	2.89	38.85	17.49	27.79	6.95	93.24	41.97
7	29.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	31.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	32.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	34.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
7	35.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-60	-
Chainage	6+488	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	142.54	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-60	1.20	20.50	18.00	18.00	240.68	106.17	14.06	3.51
BH-60	1.20	22.00	19.50	19.50	257.06	120.01	14.43	3.61
BH-60	1.20	23.50	21.00	21.00	289.51	134.24	14.79	3.70
BH-60	1.20	25.00	22.50	22.50	306.46	148.48	14.79	3.70
BH-60	1.20	26.50	24.00	24.00	323.40	162.71	15.15	3.79
BH-60	1.20	28.00	25.50	25.50	340.34	176.94	15.15	3.79
BH-60	1.20	29.50	27.00	27.00	357.28	191.18	15.51	3.88
BH-60	1.20	31.00	28.50	28.50	374.22	205.41	15.51	3.88
BH-60	1.20	32.50	30.00	30.00	391.17	219.65	15.51	3.88
BH-60	1.20	34.00	31.50	31.50	408.11	233.88	15.51	3.88
BH-60	1.20	35.00	32.50	32.50	419.40	243.37	15.51	3.88

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.12	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.84	13.69	5.65	1.49	14.27	15.76	6.30	6.75
2	4.00	5.50	1.50	Granular	9.12	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	20.53	27.37	5.65	4.47	26.05	32.02	12.81	10.38
3	5.50	7.00	1.50	Granular	9.12	0.06	24	-	8.00	9.78	1.00	-	6.25	7.00	34.21	41.06	5.65	8.13	50.55	64.65	25.86	15.03
4	7.00	8.50	1.50	Granular	8.89	0.06	24	-	8.00	9.78	1.00	-	7.75	8.50	47.73	54.40	5.65	11.35	65.24	90.68	36.27	20.58
5	8.50	10.00	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	61.07	67.74	5.65	15.73	108.63	149.80	59.92	27.36
6	10.00	11.50	1.50	Granular	8.89	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	74.41	81.08	5.65	19.16	128.61	188.94	75.57	35.10
7	11.50	13.00	1.50	Granular	8.89	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	87.75	94.42	5.65	23.47	174.51	258.30	103.32	44.05
8	13.00	14.50	1.50	Granular	10.69	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	102.44	110.46	5.65	27.40	204.43	315.62	126.25	54.09
9	14.50	16.00	1.50	Granular	10.69	0.07	28	-	15.70	17.82	1.00	-	15.25	16.00	118.48	126.50	5.65	32.86	267.23	411.28	164.51	65.67
10	16.00	17.50	1.50	Granular	10.69	0.07	28	-	15.70	17.82	1.00	-	16.75	17.50	134.52	142.54	5.65	37.31	299.67	481.03	192.41	78.49
11	17.50	19.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	18.25	19.00	142.54	142.54	5.65	40.94	338.46	560.76	224.30	92.33
12	19.00	20.50	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	19.75	20.50	142.54	142.54	5.65	40.94	338.46	601.70	240.68	106.17
13	20.50	22.00	1.50	Granular	10.69	0.08	29	-	17.60	20.13	1.00	-	21.25	22.00	142.54	142.54	5.65	40.94	338.46	642.64	257.06	120.01
14	22.00	23.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	142.54	142.54	5.65	42.35	377.24	723.79	289.51	134.24
15	23.50	25.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	142.54	142.54	5.65	42.35	377.24	766.14	306.46	148.48
16	25.00	26.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	142.54	142.54	5.65	42.35	377.24	808.50	323.40	162.71
17	26.50	28.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	142.54	142.54	5.65	42.35	377.24	850.85	340.34	176.94
18	28.00	29.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	142.54	142.54	5.65	42.35	377.24	893.21	357.28	191.18
19	29.50	31.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	142.54	142.54	5.65	42.35	377.24	935.56	374.22	205.41
20	31.00	32.50	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	142.54	142.54	5.65	42.35	377.24	977.92	391.17	219.65
21	32.50	34.00	1.50	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	142.54	142.54	5.65	42.35	377.24	1020.27	408.11	233.88
22	34.00	35.00	1.00	Granular	10.69	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	142.54	142.54	3.77	28.24	377.24	1048.51	419.40	243.37

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
2	22.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
4	25.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
5	26.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
6	28.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	0.66	2.06	1.85	7.82	7.01	0.132	0.528	15.15	3.79	59.27	26.54	36.36	9.09	142.25	63.70
7	29.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	31.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	32.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	34.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
7	35.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70

A.8. Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-61	1.00	20.50	18.00	18.00	214.32	104.09	11.85	2.96	144.79	75.02	11.85	2.96
BH-61	1.00	22.00	19.50	19.50	240.36	116.12	12.12	3.03	163.24	83.99	12.12	3.03
BH-61	1.00	23.50	21.00	21.00	255.19	128.15	12.12	3.03	173.70	92.96	12.12	3.03
BH-61	1.00	25.00	22.50	22.50	270.03	140.18	12.39	3.10	184.16	101.93	12.39	3.10
BH-61	1.00	26.50	24.00	24.00	284.86	152.21	12.65	3.16	194.62	110.91	12.65	3.16
BH-61	1.00	28.00	25.50	25.50	299.69	164.24	12.65	3.16	205.08	119.88	12.65	3.16
BH-61	1.00	29.50	27.00	27.00	314.52	176.27	12.91	3.23	215.54	128.85	12.91	3.23
BH-61	1.00	31.00	28.50	28.50	329.35	188.30	12.91	3.23	226.00	137.82	12.91	3.23
BH-61	1.00	32.50	30.00	30.00	344.18	200.34	12.91	3.23	236.46	146.79	12.91	3.23
BH-61	1.00	34.00	31.50	31.50	359.01	212.37	12.91	3.23	246.92	155.76	12.91	3.23
BH-61	1.00	35.00	32.50	32.50	368.90	220.39	12.91	3.23	253.89	161.74	12.91	3.23
BH-61	1.20	20.50	18.00	18.00	311.08	136.00	15.51	3.88	220.92	101.11	15.51	3.88
BH-61	1.20	22.00	19.50	19.50	350.38	152.79	15.86	3.96	250.34	114.23	15.86	3.96
BH-61	1.20	23.50	21.00	21.00	370.97	169.58	15.86	3.96	265.69	127.35	15.86	3.96
BH-61	1.20	25.00	22.50	22.50	391.57	186.37	16.20	4.05	281.04	140.47	16.20	4.05
BH-61	1.20	26.50	24.00	24.00	412.16	203.16	16.54	4.14	296.39	153.59	16.54	4.14
BH-61	1.20	28.00	25.50	25.50	432.75	219.95	16.54	4.14	311.74	166.71	16.54	4.14
BH-61	1.20	29.50	27.00	27.00	453.35	236.74	16.88	4.22	327.08	179.83	16.88	4.22
BH-61	1.20	31.00	28.50	28.50	473.94	253.53	16.88	4.22	342.43	192.94	16.88	4.22

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-61	1.20	32.50	30.00	30.00	494.53	270.32	16.88	4.22	357.78	206.06	16.88	4.22
BH-61	1.20	34.00	31.50	31.50	515.13	287.11	16.88	4.22	373.13	219.18	16.88	4.22
BH-61	1.20	35.00	32.50	32.50	528.86	298.30	16.88	4.22	383.36	227.93	16.88	4.22
BH-62	1.00	20.50	18.00	16.50	209.55	103.19	12.32	3.08	139.58	73.81	12.32	3.08
BH-62	1.00	22.00	19.50	18.00	234.66	114.84	12.32	3.08	157.10	82.40	12.32	3.08
BH-62	1.00	23.50	21.00	19.50	248.95	126.49	12.32	3.08	167.02	90.99	12.32	3.08
BH-62	1.00	25.00	22.50	21.00	263.23	138.14	12.63	3.16	176.93	99.59	12.63	3.16
BH-62	1.00	26.50	24.00	22.50	277.52	149.79	12.93	3.23	186.85	108.18	12.93	3.23
BH-62	1.00	28.00	25.50	24.00	291.81	161.44	12.93	3.23	196.77	116.77	12.93	3.23
BH-62	1.00	29.50	27.00	25.50	306.19	173.09	13.23	3.31	206.78	125.36	13.23	3.31
BH-62	1.00	31.00	28.50	27.00	320.48	184.74	13.23	3.31	216.69	133.95	13.23	3.31
BH-62	1.00	32.50	30.00	28.50	334.77	196.39	13.23	3.31	226.61	142.54	13.23	3.31
BH-62	1.00	34.00	31.50	30.00	349.05	208.05	13.23	3.31	236.53	151.13	13.23	3.31
BH-62	1.00	35.00	32.50	31.00	358.58	215.81	13.52	3.38	243.14	156.86	13.52	3.38
BH-62	1.20	20.50	18.00	16.50	313.02	136.54	16.03	4.01	222.34	101.29	16.03	4.01
BH-62	1.20	22.00	19.50	18.00	352.61	153.44	16.03	4.01	252.05	114.52	16.03	4.01
BH-62	1.20	23.50	21.00	19.50	373.35	170.33	16.03	4.01	267.55	127.74	16.03	4.01
BH-62	1.20	25.00	22.50	21.00	394.10	187.23	16.43	4.11	283.05	140.96	16.43	4.11
BH-62	1.20	26.50	24.00	22.50	414.84	204.13	16.82	4.20	298.54	154.19	16.82	4.20
BH-62	1.20	28.00	25.50	24.00	435.59	221.02	16.82	4.20	314.04	167.41	16.82	4.20
BH-62	1.20	29.50	27.00	25.50	456.49	237.92	17.20	4.30	329.70	180.64	17.20	4.30
BH-62	1.20	31.00	28.50	27.00	477.24	254.81	17.20	4.30	345.20	193.86	17.20	4.30
BH-62	1.20	32.50	30.00	28.50	497.98	271.71	17.20	4.30	360.70	207.09	17.20	4.30
BH-62	1.20	34.00	31.50	30.00	518.73	288.61	17.20	4.30	376.20	220.31	17.20	4.30
BH-62	1.20	35.00	32.50	31.00	532.56	299.87	17.58	4.40	386.54	229.13	17.58	4.40

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-63	1.00	20.50	18.00	18.00	265.93	119.93	12.39	3.10	170.58	82.32	12.39	3.10
BH-63	1.00	22.00	19.50	19.50	283.23	133.69	12.39	3.10	182.06	92.01	12.39	3.10
BH-63	1.00	23.50	21.00	21.00	300.54	147.45	12.39	3.10	193.53	101.69	12.39	3.10
BH-63	1.00	25.00	22.50	22.50	317.84	161.22	12.39	3.10	205.01	111.37	12.39	3.10
BH-63	1.00	26.50	24.00	24.00	335.06	174.98	12.39	3.10	216.40	121.06	12.39	3.10
BH-63	1.00	28.00	25.50	25.50	352.36	188.74	12.39	3.10	227.87	130.74	12.39	3.10
BH-63	1.00	29.50	27.00	27.00	369.67	202.50	12.39	3.10	239.35	140.42	12.39	3.10
BH-63	1.00	31.00	28.50	28.50	386.97	216.27	12.39	3.10	250.83	150.11	12.39	3.10
BH-63	1.00	32.50	30.00	30.00	404.28	230.03	12.39	3.10	262.30	159.79	12.39	3.10
BH-63	1.00	34.00	31.50	31.50	421.58	243.79	12.39	3.10	273.78	169.47	12.39	3.10
BH-63	1.00	35.00	32.50	32.50	433.12	252.97	12.39	3.10	281.43	175.93	12.39	3.10
BH-63	1.20	20.50	18.00	18.00	392.11	156.88	16.20	4.05	267.71	111.76	16.20	4.05
BH-63	1.20	22.00	19.50	19.50	416.48	176.31	16.20	4.05	285.08	126.29	16.20	4.05
BH-63	1.20	23.50	21.00	21.00	440.84	195.74	16.20	4.05	302.45	140.83	16.20	4.05
BH-63	1.20	25.00	22.50	22.50	465.21	215.17	16.20	4.05	319.82	155.36	16.20	4.05
BH-63	1.20	26.50	24.00	24.00	489.41	234.60	16.20	4.05	337.03	169.90	16.20	4.05
BH-63	1.20	28.00	25.50	25.50	513.78	254.03	16.20	4.05	354.40	184.43	16.20	4.05
BH-63	1.20	29.50	27.00	27.00	538.15	273.46	16.20	4.05	371.78	198.97	16.20	4.05
BH-63	1.20	31.00	28.50	28.50	562.51	292.90	16.20	4.05	389.15	213.50	16.20	4.05
BH-63	1.20	32.50	30.00	30.00	586.88	312.33	16.20	4.05	406.52	228.04	16.20	4.05
BH-63	1.20	34.00	31.50	31.50	611.24	331.76	16.20	4.05	423.89	242.57	16.20	4.05
BH-63	1.20	35.00	32.50	32.50	627.49	344.71	16.20	4.05	435.47	252.26	16.20	4.05
BH-64	1.00	20.50	18.00	15.00	207.97	109.86	13.16	3.29	128.41	74.30	13.16	3.29
BH-64	1.00	22.00	19.50	16.50	261.56	123.00	13.48	3.37	163.30	83.36	13.48	3.37
BH-64	1.00	23.50	21.00	18.00	277.98	136.15	13.48	3.37	173.89	92.43	13.48	3.37

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-64	1.00	25.00	22.50	19.50	294.40	149.29	13.80	3.45	184.48	101.49	13.80	3.45
BH-64	1.00	26.50	24.00	21.00	310.82	162.44	13.80	3.45	195.08	110.55	13.80	3.45
BH-64	1.00	28.00	25.50	22.50	327.24	175.58	13.80	3.45	205.67	119.62	13.80	3.45
BH-64	1.00	29.50	27.00	24.00	343.66	188.72	14.12	3.53	216.26	128.68	14.12	3.53
BH-64	1.00	31.00	28.50	25.50	360.09	201.87	14.12	3.53	226.86	137.75	14.12	3.53
BH-64	1.00	32.50	30.00	27.00	376.51	215.01	14.12	3.53	237.45	146.81	14.12	3.53
BH-64	1.00	34.00	31.50	28.50	392.93	228.16	14.43	3.61	248.04	155.88	14.43	3.61
BH-64	1.00	35.00	32.50	29.50	403.88	236.92	14.43	3.61	255.10	161.92	14.43	3.61
BH-64	1.20	20.50	18.00	15.00	302.38	144.42	17.09	4.27	200.00	101.74	17.09	4.27
BH-64	1.20	22.00	19.50	16.50	389.38	163.18	17.51	4.38	261.48	115.61	17.51	4.38
BH-64	1.20	23.50	21.00	18.00	412.80	181.94	17.51	4.38	277.90	129.48	17.51	4.38
BH-64	1.20	25.00	22.50	19.50	436.21	200.71	17.93	4.48	294.32	143.35	17.93	4.48
BH-64	1.20	26.50	24.00	21.00	459.62	219.47	17.93	4.48	310.73	157.21	17.93	4.48
BH-64	1.20	28.00	25.50	22.50	483.03	238.23	17.93	4.48	327.15	171.08	17.93	4.48
BH-64	1.20	29.50	27.00	24.00	506.44	257.00	18.34	4.59	343.57	184.95	18.34	4.59
BH-64	1.20	31.00	28.50	25.50	529.85	275.76	18.34	4.59	359.99	198.82	18.34	4.59
BH-64	1.20	32.50	30.00	27.00	553.27	294.52	18.34	4.59	376.41	212.68	18.34	4.59
BH-64	1.20	34.00	31.50	28.50	576.68	313.29	18.75	4.69	392.82	226.55	18.75	4.69
BH-64	1.20	35.00	32.50	29.50	592.29	325.79	18.75	4.69	403.77	235.80	18.75	4.69
BH-65	1.00	20.50	18.00	16.50	198.10	105.90	10.40	2.60	118.39	70.24	10.40	2.60
BH-65	1.00	22.00	19.50	18.00	224.37	117.71	10.73	2.68	134.93	78.24	10.73	2.68
BH-65	1.00	23.50	21.00	19.50	238.89	129.52	11.06	2.77	144.01	86.24	11.06	2.77
BH-65	1.00	25.00	22.50	21.00	265.68	141.70	11.38	2.85	160.88	94.47	11.38	2.85
BH-65	1.00	26.50	24.00	22.50	280.63	153.87	11.70	2.93	170.19	102.70	11.70	2.93
BH-65	1.00	28.00	25.50	24.00	307.93	166.41	12.01	3.00	187.38	111.16	12.01	3.00

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-65	1.00	29.50	27.00	25.50	323.48	178.94	12.01	3.00	197.10	119.62	12.01	3.00
BH-65	1.00	31.00	28.50	27.00	339.03	191.48	12.32	3.08	206.82	128.07	12.32	3.08
BH-65	1.00	32.50	30.00	28.50	354.59	204.01	12.32	3.08	216.55	136.53	12.32	3.08
BH-65	1.00	34.00	31.50	30.00	370.14	216.55	12.63	3.16	226.27	144.98	12.63	3.16
BH-65	1.00	35.00	32.50	31.00	380.51	224.91	12.63	3.16	232.75	150.62	12.63	3.16
BH-65	1.20	20.50	18.00	16.50	282.57	138.12	13.53	3.38	180.01	95.32	13.53	3.38
BH-65	1.20	22.00	19.50	18.00	322.28	154.58	13.97	3.49	207.02	107.22	13.97	3.49
BH-65	1.20	23.50	21.00	19.50	342.41	171.05	14.39	3.60	220.62	119.11	14.39	3.60
BH-65	1.20	25.00	22.50	21.00	382.84	188.02	14.81	3.70	248.11	131.35	14.81	3.70
BH-65	1.20	26.50	24.00	22.50	403.54	204.98	15.22	3.81	262.06	143.58	15.22	3.81
BH-65	1.20	28.00	25.50	24.00	444.68	222.46	15.63	3.91	290.02	156.16	15.63	3.91
BH-65	1.20	29.50	27.00	25.50	466.24	239.93	15.63	3.91	304.59	168.74	15.63	3.91
BH-65	1.20	31.00	28.50	27.00	487.81	257.40	16.03	4.01	319.17	181.31	16.03	4.01
BH-65	1.20	32.50	30.00	28.50	509.37	274.87	16.03	4.01	333.74	193.89	16.03	4.01
BH-65	1.20	34.00	31.50	30.00	530.94	292.34	16.43	4.11	348.31	206.46	16.43	4.11
BH-65	1.20	35.00	32.50	31.00	545.32	303.99	16.43	4.11	358.03	214.85	16.43	4.11
BH-66	1.00	22.00	19.50	19.50	260.13	123.97	10.45	2.61	159.25	82.50	10.45	2.61
BH-66	1.00	23.50	21.00	21.00	276.16	136.84	10.74	2.68	169.45	91.29	10.74	2.68
BH-66	1.00	25.00	22.50	22.50	292.19	149.71	11.02	2.76	179.65	100.08	11.02	2.76
BH-66	1.00	26.50	24.00	24.00	308.22	162.58	11.02	2.76	189.85	108.86	11.02	2.76
BH-66	1.00	28.00	25.50	25.50	324.24	175.45	11.02	2.76	200.05	117.65	11.02	2.76
BH-66	1.00	29.50	27.00	27.00	340.27	188.32	11.30	2.83	210.25	126.44	11.30	2.83
BH-66	1.00	30.00	27.50	27.50	345.61	192.61	11.30	2.83	213.65	129.37	11.30	2.83
BH-66	1.20	22.00	19.50	19.50	386.40	164.57	13.68	3.42	255.35	114.80	13.68	3.42
BH-66	1.20	23.50	21.00	21.00	409.23	182.93	14.06	3.51	271.19	128.26	14.06	3.51

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-66	1.20	25.00	22.50	22.50	432.07	201.28	14.43	3.61	287.03	141.72	14.43	3.61
BH-66	1.20	26.50	24.00	24.00	454.90	219.64	14.43	3.61	302.87	155.18	14.43	3.61
BH-66	1.20	28.00	25.50	25.50	477.73	238.00	14.43	3.61	318.70	168.64	14.43	3.61
BH-66	1.20	29.50	27.00	27.00	500.56	256.36	14.79	3.70	334.54	182.11	14.79	3.70
BH-66	1.20	30.00	27.50	27.50	508.17	262.48	14.79	3.70	339.82	186.59	14.79	3.70
BH-67	1.00	22.00	19.50	19.50	247.60	118.51	10.16	2.54	148.37	78.19	10.16	2.54
BH-67	1.00	23.50	21.00	21.00	262.97	130.92	10.45	2.61	157.91	86.51	10.45	2.61
BH-67	1.00	25.00	22.50	22.50	254.09	142.60	10.45	2.61	152.17	94.40	10.45	2.61
BH-67	1.00	26.50	24.00	24.00	268.43	154.29	10.45	2.61	161.07	102.28	10.45	2.61
BH-67	1.00	28.00	25.50	25.50	307.02	166.70	10.45	2.61	185.25	110.60	10.45	2.61
BH-67	1.00	29.50	27.00	27.00	322.39	179.10	10.74	2.68	194.79	118.93	10.74	2.68
BH-67	1.00	30.00	27.50	27.50	327.51	183.24	10.74	2.68	197.97	121.70	10.74	2.68
BH-67	1.20	22.00	19.50	19.50	369.87	157.76	13.30	3.32	240.80	109.37	13.30	3.32
BH-67	1.20	23.50	21.00	21.00	391.91	175.56	13.68	3.42	255.85	122.28	13.68	3.42
BH-67	1.20	25.00	22.50	22.50	372.51	192.33	13.68	3.42	242.27	134.48	13.68	3.42
BH-67	1.20	26.50	24.00	24.00	393.08	209.11	13.68	3.42	256.31	146.69	13.68	3.42
BH-67	1.20	28.00	25.50	25.50	455.09	226.91	13.68	3.42	298.98	159.59	13.68	3.42
BH-67	1.20	29.50	27.00	27.00	477.13	244.71	14.06	3.51	314.02	172.50	14.06	3.51
BH-67	1.20	30.00	27.50	27.50	484.47	250.65	14.06	3.51	319.04	176.80	14.06	3.51
BH-68	1.00	22.00	19.50	19.50	252.02	124.60	10.45	2.61	156.49	83.87	10.45	2.61
BH-68	1.00	23.50	21.00	21.00	267.98	137.42	10.45	2.61	166.82	92.74	10.45	2.61
BH-68	1.00	25.00	22.50	22.50	284.02	150.24	10.74	2.68	177.23	101.62	10.74	2.68
BH-68	1.00	26.50	24.00	24.00	299.98	163.06	10.74	2.68	187.55	110.50	10.74	2.68
BH-68	1.00	28.00	25.50	25.50	315.94	175.88	10.74	2.68	197.88	119.38	10.74	2.68
BH-68	1.00	29.50	27.00	27.00	331.90	188.70	10.74	2.68	208.21	128.25	10.74	2.68

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-68	1.00	30.00	27.50	27.50	349.87	193.10	10.74	2.68	219.94	131.30	10.74	2.68
BH-68	1.20	22.00	19.50	19.50	371.62	165.01	13.68	3.42	248.02	116.13	13.68	3.42
BH-68	1.20	23.50	21.00	21.00	394.35	183.29	13.68	3.42	264.00	129.69	13.68	3.42
BH-68	1.20	25.00	22.50	22.50	417.23	201.58	14.06	3.51	280.12	143.24	14.06	3.51
BH-68	1.20	26.50	24.00	24.00	439.96	219.87	14.06	3.51	296.09	156.80	14.06	3.51
BH-68	1.20	28.00	25.50	25.50	462.70	238.16	14.06	3.51	312.06	170.36	14.06	3.51
BH-68	1.20	29.50	27.00	27.00	485.43	256.45	14.06	3.51	328.04	183.91	14.06	3.51
BH-68	1.20	30.00	27.50	27.50	514.58	262.73	14.06	3.51	348.68	188.56	14.06	3.51
BH-69	1.00	22.00	19.50	19.50	228.49	119.76	10.16	2.54	137.83	79.44	10.16	2.54
BH-69	1.00	23.50	21.00	21.00	243.21	131.72	10.16	2.54	147.12	87.59	10.16	2.54
BH-69	1.00	25.00	22.50	22.50	245.50	143.30	10.16	2.54	148.45	95.50	10.16	2.54
BH-69	1.00	26.50	24.00	24.00	259.69	154.89	10.16	2.54	157.40	103.42	10.16	2.54
BH-69	1.00	28.00	25.50	25.50	298.77	167.22	10.45	2.61	182.26	111.80	10.45	2.61
BH-69	1.00	29.50	27.00	27.00	314.02	179.54	10.45	2.61	191.88	120.18	10.45	2.61
BH-69	1.00	30.00	27.50	27.50	331.19	183.77	10.45	2.61	202.81	123.05	10.45	2.61
BH-69	1.20	22.00	19.50	19.50	335.50	159.34	13.30	3.32	218.79	110.96	13.30	3.32
BH-69	1.20	23.50	21.00	21.00	356.53	176.44	13.30	3.32	233.29	123.48	13.30	3.32
BH-69	1.20	25.00	22.50	22.50	356.39	193.01	13.30	3.32	233.03	135.65	13.30	3.32
BH-69	1.20	26.50	24.00	24.00	376.67	209.58	13.30	3.32	247.01	147.81	13.30	3.32
BH-69	1.20	28.00	25.50	25.50	439.28	227.20	13.68	3.42	290.51	160.70	13.68	3.42
BH-69	1.20	29.50	27.00	27.00	461.06	244.82	13.68	3.42	305.53	173.58	13.68	3.42
BH-69	1.20	30.00	27.50	27.50	488.99	250.86	13.68	3.42	324.95	178.00	13.68	3.42
BH-69A	1.00	22.00	19.50	19.50	256.24	123.41	10.74	2.68	155.07	81.72	10.74	2.68
BH-69A	1.00	23.50	21.00	21.00	272.41	136.04	10.74	2.68	165.41	90.28	10.74	2.68
BH-69A	1.00	25.00	22.50	22.50	275.75	148.31	10.74	2.68	167.40	98.60	10.74	2.68

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-69A	1.00	26.50	24.00	24.00	290.92	160.58	10.74	2.68	176.94	106.93	10.74	2.68
BH-69A	1.00	28.00	25.50	25.50	306.09	172.85	10.74	2.68	186.48	115.25	10.74	2.68
BH-69A	1.00	29.50	27.00	27.00	321.26	185.11	10.74	2.68	196.01	123.58	10.74	2.68
BH-69A	1.00	30.00	27.50	27.50	326.32	189.20	10.74	2.68	199.19	126.35	10.74	2.68
BH-69A	1.20	22.00	19.50	19.50	370.73	161.66	14.06	3.51	239.33	111.64	14.06	3.51
BH-69A	1.20	23.50	21.00	21.00	393.18	179.17	14.06	3.51	254.79	124.26	14.06	3.51
BH-69A	1.20	25.00	22.50	22.50	394.51	196.18	14.06	3.51	255.53	136.54	14.06	3.51
BH-69A	1.20	26.50	24.00	24.00	415.41	213.19	14.06	3.51	269.67	148.82	14.06	3.51
BH-69A	1.20	28.00	25.50	25.50	436.32	230.20	14.06	3.51	283.82	161.09	14.06	3.51
BH-69A	1.20	29.50	27.00	27.00	457.23	247.21	14.06	3.51	297.97	173.37	14.06	3.51
BH-69A	1.20	30.00	27.50	27.50	464.20	252.89	14.06	3.51	302.68	177.46	14.06	3.51
BH-69B	1.00	22.00	19.50	13.50	177.63	93.49	11.65	2.91	133.55	75.49	11.65	2.91
BH-69B	1.00	23.50	21.00	15.00	190.63	103.97	12.04	3.01	143.53	83.86	12.04	3.01
BH-69B	1.00	25.00	22.50	16.50	203.25	114.46	12.42	3.11	153.13	92.23	12.42	3.11
BH-69B	1.00	26.50	24.00	18.00	226.56	125.26	12.80	3.20	170.92	100.84	12.80	3.20
BH-69B	1.00	28.00	25.50	19.50	239.63	136.06	13.16	3.29	180.86	109.44	13.16	3.29
BH-69B	1.00	29.50	27.00	21.00	252.70	146.86	13.53	3.38	190.80	118.05	13.53	3.38
BH-69B	1.00	30.00	27.50	21.50	267.44	150.56	13.53	3.38	202.07	121.00	13.53	3.38
BH-69B	1.20	22.00	19.50	13.50	349.27	157.29	15.21	3.80	197.45	100.99	15.21	3.80
BH-69B	1.20	23.50	21.00	15.00	373.39	176.08	15.73	3.93	211.78	112.92	15.73	3.93
BH-69B	1.20	25.00	22.50	16.50	396.84	194.87	16.23	4.06	225.43	124.86	16.23	4.06
BH-69B	1.20	26.50	24.00	18.00	443.80	214.25	16.72	4.18	252.99	137.14	16.72	4.18
BH-69B	1.20	28.00	25.50	19.50	468.09	233.62	17.21	4.30	267.14	149.42	17.21	4.30
BH-69B	1.20	29.50	27.00	21.00	492.38	253.00	17.68	4.42	281.29	161.69	17.68	4.42
BH-69B	1.20	30.00	27.50	21.50	523.43	259.65	17.68	4.42	299.57	165.90	17.68	4.42

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-70	1.00	22.00	19.50	15.00	216.40	111.74	11.26	2.82	132.42	76.10	11.26	2.82
BH-70	1.00	23.50	21.00	16.50	231.05	123.65	12.01	3.00	141.63	84.19	12.01	3.00
BH-70	1.00	25.00	22.50	18.00	245.69	135.55	12.01	3.00	150.84	92.29	12.01	3.00
BH-70	1.00	26.50	24.00	19.50	272.69	147.82	12.01	3.00	167.92	100.61	12.01	3.00
BH-70	1.00	28.00	25.50	21.00	287.86	160.09	12.38	3.10	177.45	108.94	12.38	3.10
BH-70	1.00	29.50	27.00	22.50	303.03	172.35	12.74	3.19	186.99	117.26	12.74	3.19
BH-70	1.00	30.00	27.50	23.00	320.09	176.57	12.74	3.19	197.82	120.11	12.74	3.19
BH-70	1.20	22.00	19.50	15.00	311.74	147.21	14.65	3.66	203.04	104.43	14.65	3.66
BH-70	1.20	23.50	21.00	16.50	331.93	163.71	15.63	3.91	216.70	116.37	15.63	3.91
BH-70	1.20	25.00	22.50	18.00	352.11	180.22	15.63	3.91	230.35	128.30	15.63	3.91
BH-70	1.20	26.50	24.00	19.50	392.61	197.23	15.63	3.91	257.91	140.58	15.63	3.91
BH-70	1.20	28.00	25.50	21.00	413.51	214.24	16.11	4.03	272.06	152.86	16.11	4.03
BH-70	1.20	29.50	27.00	22.50	434.42	231.25	16.58	4.15	286.21	165.14	16.58	4.15
BH-70	1.20	30.00	27.50	23.00	461.22	237.09	16.58	4.15	304.49	169.35	16.58	4.15

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-61	-
Chainage	6+639	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	149.73	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.35	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-61	1.00	20.50	18.00	18.00	214.32	104.09	11.85	2.96
BH-61	1.00	22.00	19.50	19.50	240.36	116.12	12.12	3.03
BH-61	1.00	23.50	21.00	21.00	255.19	128.15	12.12	3.03
BH-61	1.00	25.00	22.50	22.50	270.03	140.18	12.39	3.10
BH-61	1.00	26.50	24.00	24.00	284.86	152.21	12.65	3.16
BH-61	1.00	28.00	25.50	25.50	299.69	164.24	12.65	3.16
BH-61	1.00	29.50	27.00	27.00	314.52	176.27	12.91	3.23
BH-61	1.00	31.00	28.50	28.50	329.35	188.30	12.91	3.23
BH-61	1.00	32.50	30.00	30.00	344.18	200.34	12.91	3.23
BH-61	1.00	34.00	31.50	31.50	359.01	212.37	12.91	3.23
BH-61	1.00	35.00	32.50	32.50	368.90	220.39	12.91	3.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	4.71	2.39	21.22	23.61	9.45	5.07
2	4.00	5.50	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	4.71	7.18	38.47	48.04	19.22	8.73
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	4.71	13.52	86.49	109.58	43.83	14.16
4	7.00	8.50	1.50	Granular	10.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	83.40	91.19	4.71	17.90	99.70	140.68	56.27	20.82
5	8.50	10.00	1.50	Granular	10.39	0.11	26	-	11.90	13.19	1.00	-	9.25	10.00	98.99	106.78	4.71	21.24	115.91	178.14	71.25	28.42
6	10.00	11.50	1.50	Granular	10.39	0.11	26	-	11.90	13.19	1.00	-	10.75	11.50	114.58	122.37	4.71	24.59	132.12	218.94	87.57	36.95
7	11.50	13.00	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	12.25	13.00	130.17	137.96	4.71	29.01	174.25	290.08	116.03	46.73
8	13.00	14.50	1.50	Granular	7.84	0.09	27	-	13.80	15.50	1.00	-	13.75	14.50	143.84	149.73	4.71	32.06	187.24	335.13	134.05	57.35
9	14.50	16.00	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	149.73	149.73	4.71	35.84	242.99	426.71	170.68	69.04
10	16.00	17.50	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	149.73	149.73	4.71	35.84	242.99	462.55	185.02	80.72
11	17.50	19.00	1.50	Granular	7.84	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	149.73	149.73	4.71	35.84	242.99	498.39	199.36	92.41
12	19.00	20.50	1.50	Granular	10.09	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	149.73	149.73	4.71	35.84	244.55	535.79	214.32	104.09
13	20.50	22.00	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	21.25	22.00	149.73	149.73	4.71	37.08	272.59	600.91	240.36	116.12
14	22.00	23.50	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	22.75	23.50	149.73	149.73	4.71	37.08	272.59	637.99	255.19	128.15
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	149.73	149.73	4.71	37.08	272.59	675.06	270.03	140.18
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	149.73	149.73	4.71	37.08	272.59	712.14	284.86	152.21
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	149.73	149.73	4.71	37.08	272.59	749.22	299.69	164.24
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	149.73	149.73	4.71	37.08	272.59	786.29	314.52	176.27
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	149.73	149.73	4.71	37.08	272.59	823.37	329.35	188.30
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	149.73	149.73	4.71	37.08	272.59	860.44	344.18	200.34
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	149.73	149.73	4.71	37.08	272.59	897.52	359.01	212.37
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	149.73	149.73	3.14	24.72	272.59	922.24	368.90	220.39

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	31.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	32.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	34.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	35.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-61	-
Chainage	6+639	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	173.26	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.35	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-61	1.20	20.50	18.00	18.00	311.08	136.00	15.51	3.88
BH-61	1.20	22.00	19.50	19.50	350.38	152.79	15.86	3.96
BH-61	1.20	23.50	21.00	21.00	370.97	169.58	15.86	3.96
BH-61	1.20	25.00	22.50	22.50	391.57	186.37	16.20	4.05
BH-61	1.20	26.50	24.00	24.00	412.16	203.16	16.54	4.14
BH-61	1.20	28.00	25.50	25.50	432.75	219.95	16.54	4.14
BH-61	1.20	29.50	27.00	27.00	453.35	236.74	16.88	4.22
BH-61	1.20	31.00	28.50	28.50	473.94	253.53	16.88	4.22
BH-61	1.20	32.50	30.00	30.00	494.53	270.32	16.88	4.22
BH-61	1.20	34.00	31.50	31.50	515.13	287.11	16.88	4.22
BH-61	1.20	35.00	32.50	32.50	528.86	298.30	16.88	4.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	5.65	2.87	31.70	34.57	13.83	7.14
2	4.00	5.50	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	5.65	8.61	56.54	68.02	27.21	11.92
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	5.65	16.22	126.81	154.52	61.81	18.84
4	7.00	8.50	1.50	Granular	10.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	83.40	91.19	5.65	21.48	144.97	194.15	77.66	27.23
5	8.50	10.00	1.50	Granular	10.39	0.11	26	-	11.90	13.19	1.00	-	9.25	10.00	98.99	106.78	5.65	25.49	168.31	242.99	97.19	36.74
6	10.00	11.50	1.50	Granular	10.39	0.11	26	-	11.90	13.19	1.00	-	10.75	11.50	114.58	122.37	5.65	29.51	191.65	295.84	118.33	47.38
7	11.50	13.00	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	12.25	13.00	130.17	137.96	5.65	34.81	252.55	391.54	156.62	59.50
8	13.00	14.50	1.50	Granular	7.84	0.09	27	-	13.80	15.50	1.00	-	13.75	14.50	143.84	149.73	5.65	38.47	270.85	448.32	179.33	72.65
9	14.50	16.00	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	155.61	161.49	5.65	44.70	378.34	600.51	240.20	87.54
10	16.00	17.50	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	167.37	173.26	5.65	48.08	405.22	675.46	270.18	103.38
11	17.50	19.00	1.50	Granular	7.84	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	173.26	173.26	5.65	49.77	405.22	725.23	290.09	119.69
12	19.00	20.50	1.50	Granular	10.09	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	173.26	173.26	5.65	49.77	407.92	777.69	311.08	136.00
13	20.50	22.00	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	21.25	22.00	173.26	173.26	5.65	51.48	454.69	875.95	350.38	152.79
14	22.00	23.50	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	22.75	23.50	173.26	173.26	5.65	51.48	454.69	927.43	370.97	169.58
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	173.26	173.26	5.65	51.48	454.69	978.92	391.57	186.37
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	173.26	173.26	5.65	51.48	454.69	1030.40	412.16	203.16
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	173.26	173.26	5.65	51.48	454.69	1081.88	432.75	219.95
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	173.26	173.26	5.65	51.48	454.69	1133.37	453.35	236.74
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	173.26	173.26	5.65	51.48	454.69	1184.85	473.94	253.53
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	173.26	173.26	5.65	51.48	454.69	1236.33	494.53	270.32
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	173.26	173.26	5.65	51.48	454.69	1287.82	515.13	287.11
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	173.26	173.26	3.77	34.32	454.69	1322.14	528.86	298.30

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	31.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	32.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	34.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	35.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-62	-
Chainage	6+726	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	144.25	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquifiable Soil Depth	4.00	mtr
Ground Water Table from OGL	8.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-62	1.00	20.50	18.00	16.50	209.55	103.19	12.32	3.08
BH-62	1.00	22.00	19.50	18.00	234.66	114.84	12.32	3.08
BH-62	1.00	23.50	21.00	19.50	248.95	126.49	12.32	3.08
BH-62	1.00	25.00	22.50	21.00	263.23	138.14	12.63	3.16
BH-62	1.00	26.50	24.00	22.50	277.52	149.79	12.93	3.23
BH-62	1.00	28.00	25.50	24.00	291.81	161.44	12.93	3.23
BH-62	1.00	29.50	27.00	25.50	306.19	173.09	13.23	3.31
BH-62	1.00	31.00	28.50	27.00	320.48	184.74	13.23	3.31
BH-62	1.00	32.50	30.00	28.50	334.77	196.39	13.23	3.31
BH-62	1.00	34.00	31.50	30.00	349.05	208.05	13.23	3.31
BH-62	1.00	35.00	32.50	31.00	358.58	215.81	13.52	3.38

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.04	24	-	8.00	9.78	1.00	-	3.25	4.00	13.46	26.93	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.95	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	40.39	53.85	4.71	8.00	47.18	55.18	22.07	8.29
3	5.50	7.00	1.50	Granular	17.95	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	67.31	80.78	4.71	13.33	67.94	89.28	35.71	13.67
4	7.00	8.50	1.50	Granular	8.14	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	86.88	92.99	4.71	17.21	74.27	112.81	45.13	20.14
5	8.50	10.00	1.50	Granular	6.99	0.09	29	-	17.60	20.13	1.00	-	9.25	10.00	98.24	103.48	4.71	23.51	169.03	231.09	92.44	28.37
6	10.00	11.50	1.50	Granular	6.99	0.09	29	-	17.60	20.13	1.00	-	10.75	11.50	108.73	113.97	4.71	26.03	185.67	273.76	109.50	37.31
7	11.50	13.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	121.54	129.11	4.71	29.09	211.84	329.02	131.61	47.11
8	13.00	14.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	136.68	144.25	4.71	32.72	235.86	385.76	154.30	57.92
9	14.50	16.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	144.25	144.25	4.71	34.53	235.86	420.29	168.12	69.23
10	16.00	17.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	144.25	144.25	4.71	34.53	235.86	454.82	181.93	80.55
11	17.50	19.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	144.25	144.25	4.71	34.53	235.86	489.35	195.74	91.87
12	19.00	20.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	144.25	144.25	4.71	34.53	235.86	523.88	209.55	103.19
13	20.50	22.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	21.25	22.00	144.25	144.25	4.71	35.72	262.90	586.64	234.66	114.84
14	22.00	23.50	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	22.75	23.50	144.25	144.25	4.71	35.72	262.90	622.36	248.95	126.49
15	23.50	25.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	24.25	25.00	144.25	144.25	4.71	35.72	262.90	658.08	263.23	138.14
16	25.00	26.50	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	25.75	26.50	144.25	144.25	4.71	35.72	262.90	693.80	277.52	149.79
17	26.50	28.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	27.25	28.00	144.25	144.25	4.71	35.72	262.90	729.52	291.81	161.44
18	28.00	29.50	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	28.75	29.50	144.25	144.25	4.71	35.72	263.13	765.47	306.19	173.09
19	29.50	31.00	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	30.25	31.00	144.25	144.25	4.71	35.72	263.13	801.20	320.48	184.74
20	31.00	32.50	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	31.75	32.50	144.25	144.25	4.71	35.72	263.13	836.92	334.77	196.39
21	32.50	34.00	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	33.25	34.00	144.25	144.25	4.71	35.72	263.13	872.64	349.05	208.05
22	34.00	35.00	1.00	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	34.50	35.00	144.25	144.25	3.14	23.81	263.13	896.45	358.58	215.81

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
2	22.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
7	29.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	31.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	35.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-62	-
Chainage	6+726	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	174.53	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquifiable Soil Depth	4.00	mtr
Ground Water Table from OGL	8.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-62	1.20	20.50	18.00	16.50	313.02	136.54	16.03	4.01
BH-62	1.20	22.00	19.50	18.00	352.61	153.44	16.03	4.01
BH-62	1.20	23.50	21.00	19.50	373.35	170.33	16.03	4.01
BH-62	1.20	25.00	22.50	21.00	394.10	187.23	16.43	4.11
BH-62	1.20	26.50	24.00	22.50	414.84	204.13	16.82	4.20
BH-62	1.20	28.00	25.50	24.00	435.59	221.02	16.82	4.20
BH-62	1.20	29.50	27.00	25.50	456.49	237.92	17.20	4.30
BH-62	1.20	31.00	28.50	27.00	477.24	254.81	17.20	4.30
BH-62	1.20	32.50	30.00	28.50	497.98	271.71	17.20	4.30
BH-62	1.20	34.00	31.50	30.00	518.73	288.61	17.20	4.30
BH-62	1.20	35.00	32.50	31.00	532.56	299.87	17.58	4.40

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.04	24	-	8.00	9.78	1.00	-	3.25	4.00	13.46	26.93	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.95	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	40.39	53.85	5.65	9.60	69.57	79.17	31.67	11.40
3	5.50	7.00	1.50	Granular	17.95	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	67.31	80.78	5.65	16.00	99.46	125.07	50.03	18.25
4	7.00	8.50	1.50	Granular	8.14	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	86.88	92.99	5.65	20.65	107.68	153.94	61.58	26.41
5	8.50	10.00	1.50	Granular	6.99	0.09	29	-	17.60	20.13	1.00	-	9.25	10.00	98.24	103.48	5.65	28.22	244.79	319.27	127.71	36.69
6	10.00	11.50	1.50	Granular	6.99	0.09	29	-	17.60	20.13	1.00	-	10.75	11.50	108.73	113.97	5.65	31.23	268.76	374.47	149.79	47.81
7	11.50	13.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	121.54	129.11	5.65	34.91	307.07	447.68	179.07	59.96
8	13.00	14.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	136.68	144.25	5.65	39.26	341.65	521.53	208.61	73.32
9	14.50	16.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	151.82	159.39	5.65	43.61	376.24	599.73	239.89	87.91
10	16.00	17.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	166.96	174.53	5.65	47.96	410.83	682.28	272.91	103.71
11	17.50	19.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	174.53	174.53	5.65	50.13	410.83	732.42	292.97	120.13
12	19.00	20.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	174.53	174.53	5.65	50.13	410.83	782.55	313.02	136.54
13	20.50	22.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	21.25	22.00	174.53	174.53	5.65	51.86	457.94	881.52	352.61	153.44
14	22.00	23.50	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	22.75	23.50	174.53	174.53	5.65	51.86	457.94	933.38	373.35	170.33
15	23.50	25.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	24.25	25.00	174.53	174.53	5.65	51.86	457.94	985.24	394.10	187.23
16	25.00	26.50	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	25.75	26.50	174.53	174.53	5.65	51.86	457.94	1037.10	414.84	204.13
17	26.50	28.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	27.25	28.00	174.53	174.53	5.65	51.86	457.94	1088.97	435.59	221.02
18	28.00	29.50	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	28.75	29.50	174.53	174.53	5.65	51.86	458.34	1141.23	456.49	237.92
19	29.50	31.00	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	30.25	31.00	174.53	174.53	5.65	51.86	458.34	1193.09	477.24	254.81
20	31.00	32.50	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	31.75	32.50	174.53	174.53	5.65	51.86	458.34	1244.95	497.98	271.71
21	32.50	34.00	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	33.25	34.00	174.53	174.53	5.65	51.86	458.34	1296.81	518.73	288.61
22	34.00	35.00	1.00	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	34.50	35.00	174.53	174.53	3.77	34.57	458.34	1331.39	532.56	299.87

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
2	22.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
7	29.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	31.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	35.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-63	-
Chainage	6+838	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	174.71	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.70	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-63	1.00	20.50	18.00	18.00	265.93	119.93	12.39	3.10
BH-63	1.00	22.00	19.50	19.50	283.23	133.69	12.39	3.10
BH-63	1.00	23.50	21.00	21.00	300.54	147.45	12.39	3.10
BH-63	1.00	25.00	22.50	22.50	317.84	161.22	12.39	3.10
BH-63	1.00	26.50	24.00	24.00	335.06	174.98	12.39	3.10
BH-63	1.00	28.00	25.50	25.50	352.36	188.74	12.39	3.10
BH-63	1.00	29.50	27.00	27.00	369.67	202.50	12.39	3.10
BH-63	1.00	31.00	28.50	28.50	386.97	216.27	12.39	3.10
BH-63	1.00	32.50	30.00	30.00	404.28	230.03	12.39	3.10
BH-63	1.00	34.00	31.50	31.50	421.58	243.79	12.39	3.10
BH-63	1.00	35.00	32.50	32.50	433.12	252.97	12.39	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	19.20	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	14.40	28.80	4.71	2.73	24.25	26.99	10.79	5.16
2	4.00	5.50	1.50	Granular	19.20	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	43.20	57.60	4.71	8.20	43.97	54.90	21.96	9.11
3	5.50	7.00	1.50	Granular	19.20	0.08	26	-	11.90	13.19	1.00	-	6.25	7.00	72.00	86.40	4.71	15.45	98.85	125.23	50.09	15.09
4	7.00	8.50	1.50	Granular	19.20	0.08	26	-	11.90	13.19	1.00	-	7.75	8.50	100.80	115.20	4.71	21.63	128.79	176.81	70.73	22.79
5	8.50	10.00	1.50	Granular	9.39	0.08	26	-	11.90	13.19	1.00	-	9.25	10.00	122.25	129.29	4.71	26.24	138.84	213.10	85.24	31.79
6	10.00	11.50	1.50	Granular	10.09	0.08	26	-	11.90	13.19	1.00	-	10.75	11.50	136.86	144.43	4.71	29.37	154.92	258.54	103.42	41.66
7	11.50	13.00	1.50	Granular	10.09	0.10	27	-	13.80	15.50	1.00	-	12.25	13.00	152.00	159.57	4.71	33.88	200.49	338.00	135.20	52.79
8	13.00	14.50	1.50	Granular	10.09	0.10	27	-	13.80	15.50	1.00	-	13.75	14.50	167.14	174.71	4.71	37.25	219.00	393.75	157.50	64.87
9	14.50	16.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	15.25	16.00	174.71	174.71	4.71	43.26	316.78	534.80	213.92	78.64
10	16.00	17.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	16.75	17.50	174.71	174.71	4.71	43.26	316.78	578.06	231.22	92.40
11	17.50	19.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	174.71	174.71	4.71	43.26	316.78	621.32	248.53	106.16
12	19.00	20.50	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	174.71	174.71	4.71	43.26	317.01	664.82	265.93	119.93
13	20.50	22.00	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	174.71	174.71	4.71	43.26	317.01	708.08	283.23	133.69
14	22.00	23.50	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	174.71	174.71	4.71	43.26	317.01	751.34	300.54	147.45
15	23.50	25.00	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	174.71	174.71	4.71	43.26	317.01	794.61	317.84	161.22
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	174.71	174.71	4.71	43.26	316.78	837.64	335.06	174.98
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	174.71	174.71	4.71	43.26	316.78	880.90	352.36	188.74
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	174.71	174.71	4.71	43.26	316.78	924.16	369.67	202.50
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	174.71	174.71	4.71	43.26	316.78	967.43	386.97	216.27
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	174.71	174.71	4.71	43.26	316.78	1010.69	404.28	230.03
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	174.71	174.71	4.71	43.26	316.78	1053.95	421.58	243.79
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	174.71	174.71	3.14	28.84	316.78	1082.80	433.12	252.97

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
2	22.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
6	28.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	29.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	31.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	32.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	34.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	35.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-63	-
Chainage	6+838	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	204.99	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquefiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.70	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-63	1.20	20.50	18.00	18.00	392.11	156.88	16.20	4.05
BH-63	1.20	22.00	19.50	19.50	416.48	176.31	16.20	4.05
BH-63	1.20	23.50	21.00	21.00	440.84	195.74	16.20	4.05
BH-63	1.20	25.00	22.50	22.50	465.21	215.17	16.20	4.05
BH-63	1.20	26.50	24.00	24.00	489.41	234.60	16.20	4.05
BH-63	1.20	28.00	25.50	25.50	513.78	254.03	16.20	4.05
BH-63	1.20	29.50	27.00	27.00	538.15	273.46	16.20	4.05
BH-63	1.20	31.00	28.50	28.50	562.51	292.90	16.20	4.05
BH-63	1.20	32.50	30.00	30.00	586.88	312.33	16.20	4.05
BH-63	1.20	34.00	31.50	31.50	611.24	331.76	16.20	4.05
BH-63	1.20	35.00	32.50	32.50	627.49	344.71	16.20	4.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	19.20	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	14.40	28.80	5.65	3.28	36.23	39.51	15.81	7.25
2	4.00	5.50	1.50	Granular	19.20	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	43.20	57.60	5.65	9.84	64.62	77.74	31.10	12.38
3	5.50	7.00	1.50	Granular	19.20	0.08	26	-	11.90	13.19	1.00	-	6.25	7.00	72.00	86.40	5.65	18.54	144.93	176.60	70.64	19.95
4	7.00	8.50	1.50	Granular	19.20	0.08	26	-	11.90	13.19	1.00	-	7.75	8.50	100.80	115.20	5.65	25.96	188.05	245.68	98.27	29.59
5	8.50	10.00	1.50	Granular	9.39	0.08	26	-	11.90	13.19	1.00	-	9.25	10.00	122.25	129.29	5.65	31.48	201.21	290.31	116.12	40.78
6	10.00	11.50	1.50	Granular	10.09	0.08	26	-	11.90	13.19	1.00	-	10.75	11.50	136.86	144.43	5.65	35.25	224.44	348.79	139.52	53.03
7	11.50	13.00	1.50	Granular	10.09	0.10	27	-	13.80	15.50	1.00	-	12.25	13.00	152.00	159.57	5.65	40.65	290.29	455.30	182.12	66.78
8	13.00	14.50	1.50	Granular	10.09	0.10	27	-	13.80	15.50	1.00	-	13.75	14.50	167.14	174.71	5.65	44.70	316.94	526.64	210.66	81.68
9	14.50	16.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	15.25	16.00	182.28	189.85	5.65	54.17	496.96	760.83	304.33	99.22
10	16.00	17.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	16.75	17.50	197.42	204.99	5.65	58.66	535.52	858.05	343.22	118.02
11	17.50	19.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	204.99	204.99	5.65	60.91	535.52	918.97	367.59	137.45
12	19.00	20.50	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	204.99	204.99	5.65	60.91	535.92	980.28	392.11	156.88
13	20.50	22.00	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	204.99	204.99	5.65	60.91	535.92	1041.19	416.48	176.31
14	22.00	23.50	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	204.99	204.99	5.65	60.91	535.92	1102.11	440.84	195.74
15	23.50	25.00	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	204.99	204.99	5.65	60.91	535.92	1163.02	465.21	215.17
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	204.99	204.99	5.65	60.91	535.52	1223.54	489.41	234.60
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	204.99	204.99	5.65	60.91	535.52	1284.45	513.78	254.03
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	204.99	204.99	5.65	60.91	535.52	1345.36	538.15	273.46
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	204.99	204.99	5.65	60.91	535.52	1406.28	562.51	292.90
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	204.99	204.99	5.65	60.91	535.52	1467.19	586.88	312.33
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	204.99	204.99	5.65	60.91	535.52	1528.10	611.24	331.76
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	204.99	204.99	3.77	40.61	535.52	1568.71	627.49	344.71

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
2	22.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
6	28.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	29.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	31.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	32.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	34.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	35.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-64	-
Chainage	6+925	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	165.79	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-64	1.00	20.50	18.00	15.00	207.97	109.86	13.16	3.29
BH-64	1.00	22.00	19.50	16.50	261.56	123.00	13.48	3.37
BH-64	1.00	23.50	21.00	18.00	277.98	136.15	13.48	3.37
BH-64	1.00	25.00	22.50	19.50	294.40	149.29	13.80	3.45
BH-64	1.00	26.50	24.00	21.00	310.82	162.44	13.80	3.45
BH-64	1.00	28.00	25.50	22.50	327.24	175.58	13.80	3.45
BH-64	1.00	29.50	27.00	24.00	343.66	188.72	14.12	3.53
BH-64	1.00	31.00	28.50	25.50	360.09	201.87	14.12	3.53
BH-64	1.00	32.50	30.00	27.00	376.51	215.01	14.12	3.53
BH-64	1.00	34.00	31.50	28.50	392.93	228.16	14.43	3.61
BH-64	1.00	35.00	32.50	29.50	403.88	236.92	14.43	3.61

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	13.46	26.93	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.95	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	40.39	53.85	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.95	0.06	25	-	10.00	10.88	1.00	-	6.25	7.00	67.31	80.78	4.71	13.89	76.35	90.24	36.09	11.59
4	7.00	8.50	1.50	Granular	17.95	0.06	25	-	10.00	10.88	1.00	-	7.75	8.50	94.24	107.70	4.71	19.45	99.44	132.77	53.11	18.68
5	8.50	10.00	1.50	Granular	8.14	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	113.81	119.92	4.71	26.30	173.44	233.08	93.23	27.69
6	10.00	11.50	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	127.49	135.06	4.71	29.46	195.90	285.01	114.00	37.59
7	11.50	13.00	1.50	Granular	10.09	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	142.63	150.20	4.71	32.96	217.16	339.23	135.69	48.47
8	13.00	14.50	1.50	Granular	10.39	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	157.99	165.79	4.71	36.51	239.24	397.83	159.13	60.35
9	14.50	16.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	165.79	165.79	4.71	39.68	270.23	468.50	187.40	73.11
10	16.00	17.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	165.79	165.79	4.71	39.68	270.23	508.19	203.27	85.87
11	17.50	19.00	1.50	Granular	10.39	0.13	27	-	13.80	15.50	1.00	-	18.25	19.00	165.79	165.79	4.71	36.95	208.25	483.15	193.26	97.86
12	19.00	20.50	1.50	Granular	10.09	0.13	27	-	13.80	15.50	1.00	-	19.75	20.50	165.79	165.79	4.71	36.95	208.09	519.94	207.97	109.86
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	165.79	165.79	4.71	41.05	300.99	653.89	261.56	123.00
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	165.79	165.79	4.71	41.05	300.99	694.95	277.98	136.15
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	165.79	165.79	4.71	41.05	300.99	736.00	294.40	149.29
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	165.79	165.79	4.71	41.05	300.99	777.05	310.82	162.44
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	165.79	165.79	4.71	41.05	300.99	818.11	327.24	175.58
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	165.79	165.79	4.71	41.05	300.99	859.16	343.66	188.72
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	165.79	165.79	4.71	41.05	300.99	900.21	360.09	201.87
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	165.79	165.79	4.71	41.05	300.99	941.27	376.51	215.01
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	165.79	165.79	4.71	41.05	300.99	982.32	392.93	228.16
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	165.79	165.79	3.14	27.37	300.99	1009.69	403.88	236.92

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21
2	22.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.68	1.95	1.81	6.38	5.94	0.148	0.593	13.48	3.37	42.99	20.00	32.35	8.09	103.19	48.01
3	23.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.68	1.95	1.81	6.38	5.94	0.148	0.593	13.48	3.37	42.99	20.00	32.35	8.09	103.19	48.01
4	25.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
7	29.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
7	31.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
7	34.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.71	1.94	1.81	6.24	5.81	0.139	0.554	14.43	3.61	44.99	20.95	34.64	8.66	107.98	50.28
7	35.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.71	1.94	1.81	6.24	5.81	0.139	0.554	14.43	3.61	44.99	20.95	34.64	8.66	107.98	50.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-64	-
Chainage	6+925	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	196.97	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquifiable Soil Depth	5.50	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-64	1.20	20.50	18.00	15.00	302.38	144.42	17.09	4.27
BH-64	1.20	22.00	19.50	16.50	389.38	163.18	17.51	4.38
BH-64	1.20	23.50	21.00	18.00	412.80	181.94	17.51	4.38
BH-64	1.20	25.00	22.50	19.50	436.21	200.71	17.93	4.48
BH-64	1.20	26.50	24.00	21.00	459.62	219.47	17.93	4.48
BH-64	1.20	28.00	25.50	22.50	483.03	238.23	17.93	4.48
BH-64	1.20	29.50	27.00	24.00	506.44	257.00	18.34	4.59
BH-64	1.20	31.00	28.50	25.50	529.85	275.76	18.34	4.59
BH-64	1.20	32.50	30.00	27.00	553.27	294.52	18.34	4.59
BH-64	1.20	34.00	31.50	28.50	576.68	313.29	18.75	4.69
BH-64	1.20	35.00	32.50	29.50	592.29	325.79	18.75	4.69

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	13.46	26.93	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.95	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	40.39	53.85	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.95	0.06	25	-	10.00	10.88	1.00	-	6.25	7.00	67.31	80.78	5.65	16.67	111.98	128.64	51.46	15.75
4	7.00	8.50	1.50	Granular	17.95	0.06	25	-	10.00	10.88	1.00	-	7.75	8.50	94.24	107.70	5.65	23.34	145.23	185.23	74.09	24.66
5	8.50	10.00	1.50	Granular	8.14	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	113.81	119.92	5.65	31.56	251.20	322.77	129.11	35.87
6	10.00	11.50	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	127.49	135.06	5.65	35.36	283.90	390.83	156.33	48.15
7	11.50	13.00	1.50	Granular	10.09	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	142.63	150.20	5.65	39.56	314.52	461.00	184.40	61.60
8	13.00	14.50	1.50	Granular	10.39	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	157.99	165.79	5.65	43.82	346.36	536.66	214.66	76.24
9	14.50	16.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	173.58	181.38	5.65	49.86	426.83	666.99	266.80	92.58
10	16.00	17.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	189.17	196.97	5.65	54.34	462.45	756.95	302.78	110.17
11	17.50	19.00	1.50	Granular	10.39	0.13	27	-	13.80	15.50	1.00	-	18.25	19.00	196.97	196.97	5.65	52.68	356.38	703.56	281.42	127.29
12	19.00	20.50	1.50	Granular	10.09	0.13	27	-	13.80	15.50	1.00	-	19.75	20.50	196.97	196.97	5.65	52.68	356.10	755.95	302.38	144.42
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	196.97	196.97	5.65	58.53	515.08	973.46	389.38	163.18
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	196.97	196.97	5.65	58.53	515.08	1031.99	412.80	181.94
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	196.97	196.97	5.65	58.53	515.08	1090.52	436.21	200.71
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	196.97	196.97	5.65	58.53	515.08	1149.05	459.62	219.47
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	196.97	196.97	5.65	58.53	515.08	1207.58	483.03	238.23
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	196.97	196.97	5.65	58.53	515.08	1266.11	506.44	257.00
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	196.97	196.97	5.65	58.53	515.08	1324.64	529.85	275.76
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	196.97	196.97	5.65	58.53	515.08	1383.17	553.27	294.52
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	196.97	196.97	5.65	58.53	515.08	1441.69	576.68	313.29
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	196.97	196.97	3.77	39.02	515.08	1480.71	592.29	325.79

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22
2	22.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.45	1.97	1.82	7.45	6.89	0.114	0.457	17.51	4.38	65.28	30.17	42.03	10.51	156.67	72.42
3	23.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.45	1.97	1.82	7.45	6.89	0.114	0.457	17.51	4.38	65.28	30.17	42.03	10.51	156.67	72.42
4	25.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
7	29.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
7	31.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
7	34.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.48	1.96	1.82	7.29	6.74	0.107	0.427	18.75	4.69	68.32	31.61	45.00	11.25	163.96	75.86
7	35.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.48	1.96	1.82	7.29	6.74	0.107	0.427	18.75	4.69	68.32	31.61	45.00	11.25	163.96	75.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-65	-
Chainage	6+998	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	157.01	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquifiable Soil Depth	4.00	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-65	1.00	20.50	18.00	16.50	198.10	105.90	10.40	2.60
BH-65	1.00	22.00	19.50	18.00	224.37	117.71	10.73	2.68
BH-65	1.00	23.50	21.00	19.50	238.89	129.52	11.06	2.77
BH-65	1.00	25.00	22.50	21.00	265.68	141.70	11.38	2.85
BH-65	1.00	26.50	24.00	22.50	280.63	153.87	11.70	2.93
BH-65	1.00	28.00	25.50	24.00	307.93	166.41	12.01	3.00
BH-65	1.00	29.50	27.00	25.50	323.48	178.94	12.01	3.00
BH-65	1.00	31.00	28.50	27.00	339.03	191.48	12.32	3.08
BH-65	1.00	32.50	30.00	28.50	354.59	204.01	12.32	3.08
BH-65	1.00	34.00	31.50	30.00	370.14	216.55	12.63	3.16
BH-65	1.00	35.00	32.50	31.00	380.51	224.91	12.63	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.60	25.20	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.80	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.80	50.40	4.71	6.86	32.79	39.65	15.86	7.97
3	5.50	7.00	1.50	Granular	16.80	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	63.00	75.60	4.71	12.48	63.59	82.93	33.17	13.11
4	7.00	8.50	1.50	Granular	19.20	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	90.00	104.40	4.71	17.83	86.55	123.72	49.49	19.75
5	8.50	10.00	1.50	Granular	9.39	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	111.45	118.49	4.71	23.92	127.61	188.71	75.48	28.10
6	10.00	11.50	1.50	Granular	9.39	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	125.54	132.58	4.71	26.94	142.27	230.30	92.12	37.29
7	11.50	13.00	1.50	Granular	8.14	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	138.69	144.80	4.71	30.91	181.38	300.32	120.13	47.60
8	13.00	14.50	1.50	Granular	8.14	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	150.90	157.01	4.71	33.63	196.31	348.88	139.55	58.66
9	14.50	16.00	1.50	Granular	8.14	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	157.01	157.01	4.71	37.58	254.75	444.91	177.96	70.84
10	16.00	17.50	1.50	Granular	8.14	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	157.01	157.01	4.71	37.58	254.75	482.49	193.00	83.01
11	17.50	19.00	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	157.01	157.01	4.71	34.99	197.53	460.26	184.10	94.46
12	19.00	20.50	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	157.01	157.01	4.71	34.99	197.53	495.25	198.10	105.90
13	20.50	22.00	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	157.01	157.01	4.71	36.29	226.92	560.93	224.37	117.71
14	22.00	23.50	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	157.01	157.01	4.71	36.29	226.92	597.22	238.89	129.52
15	23.50	25.00	1.50	Granular	10.39	0.13	29	-	17.60	20.13	1.00	-	24.25	25.00	157.01	157.01	4.71	37.58	256.31	664.20	265.68	141.70
16	25.00	26.50	1.50	Granular	10.09	0.13	29	-	17.60	20.13	1.00	-	25.75	26.50	157.01	157.01	4.71	37.58	256.10	701.57	280.63	153.87
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	157.01	157.01	4.71	38.88	285.47	769.82	307.93	166.41
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	157.01	157.01	4.71	38.88	285.47	808.70	323.48	178.94
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	157.01	157.01	4.71	38.88	285.47	847.58	339.03	191.48
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	157.01	157.01	4.71	38.88	285.47	886.46	354.59	204.01
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	157.01	157.01	4.71	38.88	285.47	925.34	370.14	216.55
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	157.01	157.01	3.14	25.92	285.47	951.26	380.51	224.91

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
2	22.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
3	23.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
4	25.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
5	26.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
6	28.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	29.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	31.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	32.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	34.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32
7	35.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-65	-
Chainage	6+998	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	181.44	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liquifiable Soil Depth	4.00	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-65	1.20	20.50	18.00	16.50	282.57	138.12	13.53	3.38
BH-65	1.20	22.00	19.50	18.00	322.28	154.58	13.97	3.49
BH-65	1.20	23.50	21.00	19.50	342.41	171.05	14.39	3.60
BH-65	1.20	25.00	22.50	21.00	382.84	188.02	14.81	3.70
BH-65	1.20	26.50	24.00	22.50	403.54	204.98	15.22	3.81
BH-65	1.20	28.00	25.50	24.00	444.68	222.46	15.63	3.91
BH-65	1.20	29.50	27.00	25.50	466.24	239.93	15.63	3.91
BH-65	1.20	31.00	28.50	27.00	487.81	257.40	16.03	4.01
BH-65	1.20	32.50	30.00	28.50	509.37	274.87	16.03	4.01
BH-65	1.20	34.00	31.50	30.00	530.94	292.34	16.43	4.11
BH-65	1.20	35.00	32.50	31.00	545.32	303.99	16.43	4.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.60	25.20	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.80	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.80	50.40	5.65	8.24	47.97	56.21	22.48	11.01
3	5.50	7.00	1.50	Granular	16.80	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	63.00	75.60	5.65	14.98	93.09	116.31	46.52	17.58
4	7.00	8.50	1.50	Granular	19.20	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	90.00	104.40	5.65	21.40	126.38	170.98	68.39	25.95
5	8.50	10.00	1.50	Granular	9.39	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	111.45	118.49	5.65	28.70	185.03	258.34	103.34	36.36
6	10.00	11.50	1.50	Granular	9.39	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	125.54	132.58	5.65	32.33	206.13	311.77	124.71	47.79
7	11.50	13.00	1.50	Granular	8.14	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	138.69	144.80	5.65	37.09	262.46	405.19	162.08	60.55
8	13.00	14.50	1.50	Granular	8.14	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	150.90	157.01	5.65	40.36	283.96	467.04	186.82	74.22
9	14.50	16.00	1.50	Granular	8.14	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	163.12	169.23	5.65	46.86	396.38	626.32	250.53	89.72
10	16.00	17.50	1.50	Granular	8.14	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	175.33	181.44	5.65	50.36	424.28	704.59	281.84	106.19
11	17.50	19.00	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	181.44	181.44	5.65	48.52	329.06	657.89	263.16	122.16
12	19.00	20.50	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	181.44	181.44	5.65	48.52	329.06	706.42	282.57	138.12
13	20.50	22.00	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	181.44	181.44	5.65	50.32	378.02	805.70	322.28	154.58
14	22.00	23.50	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	181.44	181.44	5.65	50.32	378.02	856.02	342.41	171.05
15	23.50	25.00	1.50	Granular	10.39	0.13	29	-	17.60	20.13	1.00	-	24.25	25.00	181.44	181.44	5.65	52.12	426.98	957.09	382.84	188.02
16	25.00	26.50	1.50	Granular	10.09	0.13	29	-	17.60	20.13	1.00	-	25.75	26.50	181.44	181.44	5.65	52.12	426.62	1008.85	403.54	204.98
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	181.44	181.44	5.65	53.92	475.54	1111.69	444.68	222.46
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	181.44	181.44	5.65	53.92	475.54	1165.60	466.24	239.93
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	181.44	181.44	5.65	53.92	475.54	1219.52	487.81	257.40
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	181.44	181.44	5.65	53.92	475.54	1273.44	509.37	274.87
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	181.44	181.44	5.65	53.92	475.54	1327.35	530.94	292.34
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	181.44	181.44	3.77	35.94	475.54	1363.30	545.32	303.99

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
2	22.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
3	23.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
4	25.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
5	26.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
6	28.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	29.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	31.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	32.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	34.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43
7	35.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-66	-
Chainage	7+129	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	161.81	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	9.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-66	1.00	22.00	19.50	19.50	260.13	123.97	10.45	2.61
BH-66	1.00	23.50	21.00	21.00	276.16	136.84	10.74	2.68
BH-66	1.00	25.00	22.50	22.50	292.19	149.71	11.02	2.76
BH-66	1.00	26.50	24.00	24.00	308.22	162.58	11.02	2.76
BH-66	1.00	28.00	25.50	25.50	324.24	175.45	11.02	2.76
BH-66	1.00	29.50	27.00	27.00	340.27	188.32	11.30	2.83
BH-66	1.00	30.00	27.50	27.50	345.61	192.61	11.30	2.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	12.60	25.20	4.71	2.50	24.73	27.22	10.89	5.10
2	4.00	5.50	1.50	Granular	16.80	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	37.80	50.40	4.71	7.49	44.16	54.14	21.66	8.84
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	4.71	13.52	86.49	109.99	44.00	14.28
4	7.00	8.50	1.50	Granular	19.20	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	90.00	104.40	4.71	19.32	117.56	160.38	64.15	21.34
5	8.50	10.00	1.50	Granular	9.39	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	111.45	118.49	4.71	24.84	149.91	217.57	87.03	29.94
6	10.00	11.50	1.50	Granular	9.39	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	125.54	132.58	4.71	27.98	167.13	262.76	105.11	39.42
7	11.50	13.00	1.50	Granular	9.39	0.10	26	-	11.90	13.19	1.00	-	12.25	13.00	139.63	146.67	4.71	29.97	156.92	282.52	113.01	49.46
8	13.00	14.50	1.50	Granular	10.09	0.10	26	-	11.90	13.19	1.00	-	13.75	14.50	154.24	161.81	4.71	33.10	172.99	331.69	132.68	60.38
9	14.50	16.00	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	161.81	161.81	4.71	38.73	263.72	461.15	184.46	72.87
10	16.00	17.50	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	161.81	161.81	4.71	38.73	263.72	499.89	199.95	85.37
11	17.50	19.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	161.81	161.81	4.71	40.07	293.96	570.20	228.08	98.24
12	19.00	20.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	161.81	161.81	4.71	40.07	293.96	610.27	244.11	111.11
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	161.81	161.81	4.71	40.07	293.96	650.34	260.13	123.97
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	161.81	161.81	4.71	40.07	293.96	690.41	276.16	136.84
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	161.81	161.81	4.71	40.07	293.96	730.47	292.19	149.71
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	161.81	161.81	4.71	40.07	293.96	770.54	308.22	162.58
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	161.81	161.81	4.71	40.07	293.96	810.61	324.24	175.45
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	161.81	161.81	4.71	40.07	293.96	850.68	340.27	188.32
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	161.81	161.81	1.57	13.36	293.96	864.04	345.61	192.61

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
2	22.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
3	24.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
4	25.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
5	27.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	30.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-66	-
Chainage	7+129	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	192.09	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	9.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-66	1.20	22.00	19.50	19.50	386.40	164.57	13.68	3.42
BH-66	1.20	23.50	21.00	21.00	409.23	182.93	14.06	3.51
BH-66	1.20	25.00	22.50	22.50	432.07	201.28	14.43	3.61
BH-66	1.20	26.50	24.00	24.00	454.90	219.64	14.43	3.61
BH-66	1.20	28.00	25.50	25.50	477.73	238.00	14.43	3.61
BH-66	1.20	29.50	27.00	27.00	500.56	256.36	14.79	3.70
BH-66	1.20	30.00	27.50	27.50	508.17	262.48	14.79	3.70

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	12.60	25.20	5.65	3.00	37.13	40.13	16.05	7.17
2	4.00	5.50	1.50	Granular	16.80	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	37.80	50.40	5.65	8.99	65.11	77.09	30.84	12.06
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	5.65	16.22	126.81	155.02	62.01	18.98
4	7.00	8.50	1.50	Granular	19.20	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	90.00	104.40	5.65	23.18	171.88	223.27	89.31	27.85
5	8.50	10.00	1.50	Granular	9.39	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	111.45	118.49	5.65	29.80	217.34	298.53	119.41	38.57
6	10.00	11.50	1.50	Granular	9.39	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	125.54	132.58	5.65	33.57	242.14	356.90	142.76	50.34
7	11.50	13.00	1.50	Granular	9.39	0.10	26	-	11.90	13.19	1.00	-	12.25	13.00	139.63	146.67	5.65	35.96	227.23	377.95	151.18	62.79
8	13.00	14.50	1.50	Granular	10.09	0.10	26	-	11.90	13.19	1.00	-	13.75	14.50	154.24	161.81	5.65	39.72	250.47	440.91	176.36	76.28
9	14.50	16.00	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	169.38	176.95	5.65	48.65	416.36	655.46	262.18	92.28
10	16.00	17.50	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	184.52	192.09	5.65	53.00	450.95	743.05	297.22	109.50
11	17.50	19.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	192.09	192.09	5.65	57.08	502.67	851.84	340.74	127.85
12	19.00	20.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	192.09	192.09	5.65	57.08	502.67	908.93	363.57	146.21
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	192.09	192.09	5.65	57.08	502.67	966.01	386.40	164.57
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	192.09	192.09	5.65	57.08	502.67	1023.09	409.23	182.93
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	192.09	192.09	5.65	57.08	502.67	1080.17	432.07	201.28
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	192.09	192.09	5.65	57.08	502.67	1137.25	454.90	219.64
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	192.09	192.09	5.65	57.08	502.67	1194.33	477.73	238.00
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	192.09	192.09	5.65	57.08	502.67	1251.41	500.56	256.36
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	192.09	192.09	1.88	19.03	502.67	1270.43	508.17	262.48

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
2	22.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
3	24.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
4	25.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
5	27.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	30.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-67	-
Chainage	7+220	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	155.14	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-67	1.00	22.00	19.50	19.50	247.60	118.51	10.16	2.54
BH-67	1.00	23.50	21.00	21.00	262.97	130.92	10.45	2.61
BH-67	1.00	25.00	22.50	22.50	254.09	142.60	10.45	2.61
BH-67	1.00	26.50	24.00	24.00	268.43	154.29	10.45	2.61
BH-67	1.00	28.00	25.50	25.50	307.02	166.70	10.45	2.61
BH-67	1.00	29.50	27.00	27.00	322.39	179.10	10.74	2.68
BH-67	1.00	30.00	27.50	27.50	327.51	183.24	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	4.71	2.39	21.22	23.61	9.45	5.07
2	4.00	5.50	1.50	Granular	16.80	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	4.71	7.18	38.47	48.04	19.22	8.73
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	4.71	13.52	86.49	109.58	43.83	14.16
4	7.00	8.50	1.50	Granular	19.20	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	90.00	104.40	4.71	19.32	117.56	159.97	63.99	21.22
5	8.50	10.00	1.50	Granular	9.39	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	111.45	118.49	4.71	23.00	105.32	170.72	68.29	29.31
6	10.00	11.50	1.50	Granular	8.14	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	124.60	130.71	4.71	25.71	115.30	206.41	82.57	38.16
7	11.50	13.00	1.50	Granular	8.14	0.07	26	-	11.90	13.19	1.00	-	12.25	13.00	136.81	142.92	4.71	29.36	152.43	272.91	109.16	48.03
8	13.00	14.50	1.50	Granular	8.14	0.07	26	-	11.90	13.19	1.00	-	13.75	14.50	149.03	155.14	4.71	31.98	165.13	317.59	127.04	58.63
9	14.50	16.00	1.50	Granular	10.09	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	155.14	155.14	4.71	35.85	224.10	412.41	164.97	70.32
10	16.00	17.50	1.50	Granular	10.09	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	155.14	155.14	4.71	35.85	224.10	448.27	179.31	82.01
11	17.50	19.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	155.14	155.14	4.71	37.14	253.13	514.43	205.77	94.06
12	19.00	20.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	155.14	155.14	4.71	37.14	253.13	551.57	220.63	106.10
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	155.14	155.14	4.71	38.42	282.16	619.01	247.60	118.51
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	155.14	155.14	4.71	38.42	282.16	657.43	262.97	130.92
15	23.50	25.00	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	24.25	25.00	155.14	155.14	4.71	35.85	224.10	635.23	254.09	142.60
16	25.00	26.50	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	25.75	26.50	155.14	155.14	4.71	35.85	224.10	671.08	268.43	154.29
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	155.14	155.14	4.71	38.42	282.16	767.55	307.02	166.70
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	155.14	155.14	4.71	38.42	282.16	805.97	322.39	179.10
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	155.14	155.14	1.57	12.81	282.16	818.77	327.51	183.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-67	-
Chainage	7+220	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	185.42	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-67	1.20	22.00	19.50	19.50	369.87	157.76	13.30	3.32
BH-67	1.20	23.50	21.00	21.00	391.91	175.56	13.68	3.42
BH-67	1.20	25.00	22.50	22.50	372.51	192.33	13.68	3.42
BH-67	1.20	26.50	24.00	24.00	393.08	209.11	13.68	3.42
BH-67	1.20	28.00	25.50	25.50	455.09	226.91	13.68	3.42
BH-67	1.20	29.50	27.00	27.00	477.13	244.71	14.06	3.51
BH-67	1.20	30.00	27.50	27.50	484.47	250.65	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{sl})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	5.65	2.87	31.70	34.57	13.83	7.14
2	4.00	5.50	1.50	Granular	16.80	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	5.65	8.61	56.54	68.02	27.21	11.92
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	5.65	16.22	126.81	154.52	61.81	18.84
4	7.00	8.50	1.50	Granular	19.20	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	90.00	104.40	5.65	23.18	171.88	222.77	89.11	27.71
5	8.50	10.00	1.50	Granular	9.39	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	111.45	118.49	5.65	27.60	152.72	231.21	92.48	37.81
6	10.00	11.50	1.50	Granular	8.14	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	124.60	130.71	5.65	30.85	166.96	276.29	110.52	48.82
7	11.50	13.00	1.50	Granular	8.14	0.07	26	-	11.90	13.19	1.00	-	12.25	13.00	136.81	142.92	5.65	35.23	220.60	365.17	146.07	61.06
8	13.00	14.50	1.50	Granular	8.14	0.07	26	-	11.90	13.19	1.00	-	13.75	14.50	149.03	155.14	5.65	38.38	238.89	421.84	168.74	74.18
9	14.50	16.00	1.50	Granular	10.09	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	162.71	170.28	5.65	45.13	355.12	583.20	233.28	89.19
10	16.00	17.50	1.50	Granular	10.09	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	177.85	185.42	5.65	49.32	385.74	663.14	265.25	105.38
11	17.50	19.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	185.42	185.42	5.65	53.26	435.70	766.36	306.54	122.67
12	19.00	20.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	185.42	185.42	5.65	53.26	435.70	819.62	327.85	139.96
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	185.42	185.42	5.65	55.10	485.66	924.68	369.87	157.76
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	185.42	185.42	5.65	55.10	485.66	979.78	391.91	175.56
15	23.50	25.00	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	24.25	25.00	185.42	185.42	5.65	51.42	385.74	931.27	372.51	192.33
16	25.00	26.50	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	25.75	26.50	185.42	185.42	5.65	51.42	385.74	982.70	393.08	209.11
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	185.42	185.42	5.65	55.10	485.66	1137.72	455.09	226.91
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	185.42	185.42	5.65	55.10	485.66	1192.82	477.13	244.71
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	185.42	185.42	1.88	18.37	485.66	1211.18	484.47	250.65

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-68	-
Chainage	7+268	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	166.69	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-68	1.00	22.00	19.50	19.50	252.02	124.60	10.45	2.61
BH-68	1.00	23.50	21.00	21.00	267.98	137.42	10.45	2.61
BH-68	1.00	25.00	22.50	22.50	284.02	150.24	10.74	2.68
BH-68	1.00	26.50	24.00	24.00	299.98	163.06	10.74	2.68
BH-68	1.00	28.00	25.50	25.50	315.94	175.88	10.74	2.68
BH-68	1.00	29.50	27.00	27.00	331.90	188.70	10.74	2.68
BH-68	1.00	30.00	27.50	27.50	349.87	193.10	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	13.46	26.93	4.71	2.67	26.42	29.09	11.63	5.14
2	4.00	5.50	1.50	Granular	17.95	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	40.39	53.85	4.71	8.00	47.18	57.85	23.14	9.03
3	5.50	7.00	1.50	Granular	17.95	0.07	27	-	13.80	15.50	1.00	-	6.25	7.00	67.31	80.78	4.71	15.00	108.47	134.14	53.66	14.88
4	7.00	8.50	1.50	Granular	17.95	0.07	27	-	13.80	15.50	1.00	-	7.75	8.50	94.24	107.70	4.71	21.00	141.38	188.05	75.22	22.41
5	8.50	10.00	1.50	Granular	8.14	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	113.81	119.92	4.71	26.30	173.44	246.41	98.56	31.43
6	10.00	11.50	1.50	Granular	10.39	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	127.71	135.51	4.71	29.52	196.72	299.21	119.68	41.34
7	11.50	13.00	1.50	Granular	10.39	0.08	26	-	11.90	13.19	1.00	-	12.25	13.00	143.30	151.10	4.71	30.75	161.99	295.23	118.09	51.60
8	13.00	14.50	1.50	Granular	10.39	0.08	26	-	11.90	13.19	1.00	-	13.75	14.50	158.89	166.69	4.71	34.10	178.20	345.54	138.22	62.80
9	14.50	16.00	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	15.25	16.00	166.69	166.69	4.71	37.15	209.35	413.85	165.54	74.85
10	16.00	17.50	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	16.75	17.50	166.69	166.69	4.71	37.15	209.35	450.99	180.40	86.90
11	17.50	19.00	1.50	Granular	10.09	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	166.69	166.69	4.71	38.52	240.32	520.49	208.19	99.34
12	19.00	20.50	1.50	Granular	10.09	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	166.69	166.69	4.71	38.52	240.32	559.01	223.60	111.77
13	20.50	22.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	166.69	166.69	4.71	39.90	271.45	630.04	252.02	124.60
14	22.00	23.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	166.69	166.69	4.71	39.90	271.45	669.94	267.98	137.42
15	23.50	25.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	24.25	25.00	166.69	166.69	4.71	39.90	271.66	710.05	284.02	150.24
16	25.00	26.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	25.75	26.50	166.69	166.69	4.71	39.90	271.66	749.95	299.98	163.06
17	26.50	28.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	27.25	28.00	166.69	166.69	4.71	39.90	271.66	789.85	315.94	175.88
18	28.00	29.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	28.75	29.50	166.69	166.69	4.71	39.90	271.66	829.75	331.90	188.70
19	29.50	30.00	0.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	166.69	166.69	1.57	13.76	302.82	874.67	349.87	193.10

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
4	25.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-68	-
Chainage	7+268	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	197.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-68	1.20	22.00	19.50	19.50	371.62	165.01	13.68	3.42
BH-68	1.20	23.50	21.00	21.00	394.35	183.29	13.68	3.42
BH-68	1.20	25.00	22.50	22.50	417.23	201.58	14.06	3.51
BH-68	1.20	26.50	24.00	24.00	439.96	219.87	14.06	3.51
BH-68	1.20	28.00	25.50	25.50	462.70	238.16	14.06	3.51
BH-68	1.20	29.50	27.00	27.00	485.43	256.45	14.06	3.51
BH-68	1.20	30.00	27.50	27.50	514.58	262.73	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.95	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	13.46	26.93	5.65	3.20	39.67	42.87	17.15	7.23
2	4.00	5.50	1.50	Granular	17.95	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	40.39	53.85	5.65	9.60	69.57	82.37	32.95	12.29
3	5.50	7.00	1.50	Granular	17.95	0.07	27	-	13.80	15.50	1.00	-	6.25	7.00	67.31	80.78	5.65	18.00	159.02	189.82	75.93	19.71
4	7.00	8.50	1.50	Granular	17.95	0.07	27	-	13.80	15.50	1.00	-	7.75	8.50	94.24	107.70	5.65	25.20	206.40	262.40	104.96	29.14
5	8.50	10.00	1.50	Granular	8.14	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	113.81	119.92	5.65	31.56	251.20	338.77	135.51	40.35
6	10.00	11.50	1.50	Granular	10.39	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	127.71	135.51	5.65	35.42	285.13	408.12	163.25	52.65
7	11.50	13.00	1.50	Granular	10.39	0.08	26	-	11.90	13.19	1.00	-	12.25	13.00	143.30	151.10	5.65	36.90	234.67	394.56	157.82	65.35
8	13.00	14.50	1.50	Granular	10.39	0.08	26	-	11.90	13.19	1.00	-	13.75	14.50	158.89	166.69	5.65	40.92	258.01	458.82	183.53	79.19
9	14.50	16.00	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	15.25	16.00	174.48	182.28	5.65	46.66	330.53	578.01	231.20	94.63
10	16.00	17.50	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	16.75	17.50	190.07	197.87	5.65	50.83	357.97	656.27	262.51	111.24
11	17.50	19.00	1.50	Granular	10.09	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	197.87	197.87	5.65	54.88	410.91	764.10	305.64	128.98
12	19.00	20.50	1.50	Granular	10.09	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	197.87	197.87	5.65	54.88	410.91	818.98	327.59	146.72
13	20.50	22.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	197.87	197.87	5.65	56.84	464.14	929.04	371.62	165.01
14	22.00	23.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	197.87	197.87	5.65	56.84	464.14	985.88	394.35	183.29
15	23.50	25.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	24.25	25.00	197.87	197.87	5.65	56.84	464.50	1043.08	417.23	201.58
16	25.00	26.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	25.75	26.50	197.87	197.87	5.65	56.84	464.50	1099.91	439.96	219.87
17	26.50	28.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	27.25	28.00	197.87	197.87	5.65	56.84	464.50	1156.75	462.70	238.16
18	28.00	29.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	28.75	29.50	197.87	197.87	5.65	56.84	464.50	1213.58	485.43	256.45
19	29.50	30.00	0.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	197.87	197.87	1.88	19.60	517.77	1286.45	514.58	262.73

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
4	25.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69	-
Chainage	7+329	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	159.26	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	9.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69	1.00	22.00	19.50	19.50	228.49	119.76	10.16	2.54
BH-69	1.00	23.50	21.00	21.00	243.21	131.72	10.16	2.54
BH-69	1.00	25.00	22.50	22.50	245.50	143.30	10.16	2.54
BH-69	1.00	26.50	24.00	24.00	259.69	154.89	10.16	2.54
BH-69	1.00	28.00	25.50	25.50	298.77	167.22	10.45	2.61
BH-69	1.00	29.50	27.00	27.00	314.02	179.54	10.45	2.61
BH-69	1.00	30.00	27.50	27.50	331.19	183.77	10.45	2.61

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	4.71	2.39	21.22	23.61	9.45	5.07
2	4.00	5.50	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	4.71	7.18	38.47	48.04	19.22	8.73
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	4.71	13.52	86.49	109.58	43.83	14.16
4	7.00	8.50	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	88.20	100.80	4.71	18.93	112.69	154.71	61.88	21.11
5	8.50	10.00	1.50	Granular	9.39	0.07	24	-	8.00	9.78	1.00	-	9.25	10.00	107.85	114.89	4.71	21.36	91.55	154.93	61.97	28.74
6	10.00	11.50	1.50	Granular	9.39	0.07	24	-	8.00	9.78	1.00	-	10.75	11.50	121.94	128.98	4.71	24.16	102.41	189.95	75.98	37.16
7	11.50	13.00	1.50	Granular	10.09	0.06	26	-	11.90	13.19	1.00	-	12.25	13.00	136.55	144.12	4.71	29.31	154.59	271.44	108.57	47.01
8	13.00	14.50	1.50	Granular	10.09	0.06	26	-	11.90	13.19	1.00	-	13.75	14.50	151.69	159.26	4.71	32.55	170.34	319.73	127.89	57.77
9	14.50	16.00	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	159.26	159.26	4.71	38.12	259.67	447.19	178.88	70.10
10	16.00	17.50	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	159.26	159.26	4.71	38.12	259.67	485.32	194.13	82.42
11	17.50	19.00	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	18.25	19.00	159.26	159.26	4.71	39.44	289.45	554.53	221.81	95.11
12	19.00	20.50	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	19.75	20.50	159.26	159.26	4.71	39.44	289.45	593.97	237.59	107.81
13	20.50	22.00	1.50	Granular	10.09	0.09	28	-	15.70	17.82	1.00	-	21.25	22.00	159.26	159.26	4.71	36.81	229.89	571.22	228.49	119.76
14	22.00	23.50	1.50	Granular	10.09	0.09	28	-	15.70	17.82	1.00	-	22.75	23.50	159.26	159.26	4.71	36.81	229.89	608.03	243.21	131.72
15	23.50	25.00	1.50	Granular	10.09	0.08	27	-	13.80	15.50	1.00	-	24.25	25.00	159.26	159.26	4.71	35.49	200.12	613.74	245.50	143.30
16	25.00	26.50	1.50	Granular	10.09	0.08	27	-	13.80	15.50	1.00	-	25.75	26.50	159.26	159.26	4.71	35.49	200.12	649.24	259.69	154.89
17	26.50	28.00	1.50	Granular	10.09	0.10	29	-	17.60	20.13	1.00	-	27.25	28.00	159.26	159.26	4.71	38.12	259.67	746.92	298.77	167.22
18	28.00	29.50	1.50	Granular	10.09	0.10	29	-	17.60	20.13	1.00	-	28.75	29.50	159.26	159.26	4.71	38.12	259.67	785.04	314.02	179.54
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	159.26	159.26	1.57	13.15	289.45	827.96	331.19	183.77

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
3	24.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
6	28.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69	-
Chainage	7+329	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	189.54	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	9.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69	1.20	22.00	19.50	19.50	335.50	159.34	13.30	3.32
BH-69	1.20	23.50	21.00	21.00	356.53	176.44	13.30	3.32
BH-69	1.20	25.00	22.50	22.50	356.39	193.01	13.30	3.32
BH-69	1.20	26.50	24.00	24.00	376.67	209.58	13.30	3.32
BH-69	1.20	28.00	25.50	25.50	439.28	227.20	13.68	3.42
BH-69	1.20	29.50	27.00	27.00	461.06	244.82	13.68	3.42
BH-69	1.20	30.00	27.50	27.50	488.99	250.86	13.68	3.42

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	5.65	2.87	31.70	34.57	13.83	7.14
2	4.00	5.50	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	5.65	8.61	56.54	68.02	27.21	11.92
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	5.65	16.22	126.81	154.52	61.81	18.84
4	7.00	8.50	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	88.20	100.80	5.65	22.71	164.55	214.97	85.99	27.58
5	8.50	10.00	1.50	Granular	9.39	0.07	24	-	8.00	9.78	1.00	-	9.25	10.00	107.85	114.89	5.65	25.64	132.68	208.74	83.50	37.13
6	10.00	11.50	1.50	Granular	9.39	0.07	24	-	8.00	9.78	1.00	-	10.75	11.50	121.94	128.98	5.65	28.99	148.32	253.37	101.35	47.62
7	11.50	13.00	1.50	Granular	10.09	0.06	26	-	11.90	13.19	1.00	-	12.25	13.00	136.55	144.12	5.65	35.17	223.98	364.19	145.68	59.84
8	13.00	14.50	1.50	Granular	10.09	0.06	26	-	11.90	13.19	1.00	-	13.75	14.50	151.69	159.26	5.65	39.07	246.65	425.92	170.37	73.16
9	14.50	16.00	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	166.83	174.40	5.65	47.92	410.54	637.73	255.09	88.95
10	16.00	17.50	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	181.97	189.54	5.65	52.27	445.12	724.59	289.84	105.96
11	17.50	19.00	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	18.25	19.00	189.54	189.54	5.65	56.32	496.17	831.96	332.78	124.11
12	19.00	20.50	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	19.75	20.50	189.54	189.54	5.65	56.32	496.17	888.28	355.31	142.25
13	20.50	22.00	1.50	Granular	10.09	0.09	28	-	15.70	17.82	1.00	-	21.25	22.00	189.54	189.54	5.65	52.57	394.08	838.76	335.50	159.34
14	22.00	23.50	1.50	Granular	10.09	0.09	28	-	15.70	17.82	1.00	-	22.75	23.50	189.54	189.54	5.65	52.57	394.08	891.33	356.53	176.44
15	23.50	25.00	1.50	Granular	10.09	0.08	27	-	13.80	15.50	1.00	-	24.25	25.00	189.54	189.54	5.65	50.69	343.03	890.97	356.39	193.01
16	25.00	26.50	1.50	Granular	10.09	0.08	27	-	13.80	15.50	1.00	-	25.75	26.50	189.54	189.54	5.65	50.69	343.03	941.66	376.67	209.58
17	26.50	28.00	1.50	Granular	10.09	0.10	29	-	17.60	20.13	1.00	-	27.25	28.00	189.54	189.54	5.65	54.45	445.12	1098.20	439.28	227.20
18	28.00	29.50	1.50	Granular	10.09	0.10	29	-	17.60	20.13	1.00	-	28.75	29.50	189.54	189.54	5.65	54.45	445.12	1152.65	461.06	244.82
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	189.54	189.54	1.88	18.77	496.17	1222.47	488.99	250.86

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
3	24.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
6	28.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69A	-
Chainage	7+392	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	158.44	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69A	1.00	22.00	19.50	19.50	256.24	123.41	10.74	2.68
BH-69A	1.00	23.50	21.00	21.00	272.41	136.04	10.74	2.68
BH-69A	1.00	25.00	22.50	22.50	275.75	148.31	10.74	2.68
BH-69A	1.00	26.50	24.00	24.00	290.92	160.58	10.74	2.68
BH-69A	1.00	28.00	25.50	25.50	306.09	172.85	10.74	2.68
BH-69A	1.00	29.50	27.00	27.00	321.26	185.11	10.74	2.68
BH-69A	1.00	30.00	27.50	27.50	326.32	189.20	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	4.71	2.39	21.22	23.61	9.45	5.07
2	4.00	5.50	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	4.71	7.18	38.47	48.04	19.22	8.73
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	4.71	13.52	86.49	109.58	43.83	14.16
4	7.00	8.50	1.50	Granular	19.20	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	90.00	104.40	4.71	19.32	117.56	159.97	63.99	21.22
5	8.50	10.00	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	111.45	118.49	4.71	23.92	127.61	193.94	77.57	29.57
6	10.00	11.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	125.54	132.58	4.71	26.94	142.27	235.53	94.21	38.76
7	11.50	13.00	1.50	Granular	9.39	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	139.63	146.67	4.71	32.27	211.78	337.31	134.93	49.44
8	13.00	14.50	1.50	Granular	7.84	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	152.55	158.44	4.71	35.26	227.34	388.13	155.25	60.96
9	14.50	16.00	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	158.44	158.44	4.71	37.93	256.80	455.52	182.21	73.23
10	16.00	17.50	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	158.44	158.44	4.71	37.93	256.80	493.45	197.38	85.50
11	17.50	19.00	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	158.44	158.44	4.71	39.23	286.26	562.14	224.86	98.14
12	19.00	20.50	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	158.44	158.44	4.71	39.23	286.26	601.37	240.55	110.77
13	20.50	22.00	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	158.44	158.44	4.71	39.23	286.26	640.60	256.24	123.41
14	22.00	23.50	1.50	Granular	9.39	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	158.44	158.44	4.71	39.23	287.46	681.03	272.41	136.04
15	23.50	25.00	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	24.25	25.00	158.44	158.44	4.71	37.93	257.88	689.38	275.75	148.31
16	25.00	26.50	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	25.75	26.50	158.44	158.44	4.71	37.93	257.88	727.30	290.92	160.58
17	26.50	28.00	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	27.25	28.00	158.44	158.44	4.71	37.93	257.88	765.23	306.09	172.85
18	28.00	29.50	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	28.75	29.50	158.44	158.44	4.71	37.93	257.88	803.15	321.26	185.11
19	29.50	30.00	0.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	29.75	30.00	158.44	158.44	1.57	12.64	257.88	815.80	326.32	189.20

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
2	22.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
4	25.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69A	-
Chainage	7+392	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	181.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	8.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69A	1.20	22.00	19.50	19.50	370.73	161.66	14.06	3.51
BH-69A	1.20	23.50	21.00	21.00	393.18	179.17	14.06	3.51
BH-69A	1.20	25.00	22.50	22.50	394.51	196.18	14.06	3.51
BH-69A	1.20	26.50	24.00	24.00	415.41	213.19	14.06	3.51
BH-69A	1.20	28.00	25.50	25.50	436.32	230.20	14.06	3.51
BH-69A	1.20	29.50	27.00	27.00	457.23	247.21	14.06	3.51
BH-69A	1.20	30.00	27.50	27.50	464.20	252.89	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	5.65	2.87	31.70	34.57	13.83	7.14
2	4.00	5.50	1.50	Granular	16.80	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	5.65	8.61	56.54	68.02	27.21	11.92
3	5.50	7.00	1.50	Granular	16.80	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	63.00	75.60	5.65	16.22	126.81	154.52	61.81	18.84
4	7.00	8.50	1.50	Granular	19.20	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	90.00	104.40	5.65	23.18	171.88	222.77	89.11	27.71
5	8.50	10.00	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	111.45	118.49	5.65	28.70	185.03	264.62	105.85	38.12
6	10.00	11.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	125.54	132.58	5.65	32.33	206.13	318.05	127.22	49.54
7	11.50	13.00	1.50	Granular	9.39	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	139.63	146.67	5.65	38.72	306.64	457.28	182.91	62.76
8	13.00	14.50	1.50	Granular	7.84	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	152.55	158.44	5.65	42.31	328.77	521.72	208.69	76.98
9	14.50	16.00	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	164.32	170.20	5.65	47.20	398.24	638.39	255.36	92.58
10	16.00	17.50	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	176.08	181.97	5.65	50.58	425.12	715.85	286.34	109.11
11	17.50	19.00	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	181.97	181.97	5.65	54.07	473.89	818.69	327.48	126.63
12	19.00	20.50	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	181.97	181.97	5.65	54.07	473.89	872.76	349.10	144.14
13	20.50	22.00	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	181.97	181.97	5.65	54.07	473.89	926.83	370.73	161.66
14	22.00	23.50	1.50	Granular	9.39	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	181.97	181.97	5.65	54.07	475.95	982.96	393.18	179.17
15	23.50	25.00	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	24.25	25.00	181.97	181.97	5.65	52.27	426.98	986.26	394.51	196.18
16	25.00	26.50	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	25.75	26.50	181.97	181.97	5.65	52.27	426.98	1038.53	415.41	213.19
17	26.50	28.00	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	27.25	28.00	181.97	181.97	5.65	52.27	426.98	1090.80	436.32	230.20
18	28.00	29.50	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	28.75	29.50	181.97	181.97	5.65	52.27	426.98	1143.07	457.23	247.21
19	29.50	30.00	0.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	29.75	30.00	181.97	181.97	1.88	17.42	426.98	1160.50	464.20	252.89

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
2	22.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
4	25.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69B	-
Chainage	7+369	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	136.53	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Ground Water Table from OGL	12.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69B	1.00	22.00	19.50	13.50	177.63	93.49	11.65	2.91
BH-69B	1.00	23.50	21.00	15.00	190.63	103.97	12.04	3.01
BH-69B	1.00	25.00	22.50	16.50	203.25	114.46	12.42	3.11
BH-69B	1.00	26.50	24.00	18.00	226.56	125.26	12.80	3.20
BH-69B	1.00	28.00	25.50	19.50	239.63	136.06	13.16	3.29
BH-69B	1.00	29.50	27.00	21.00	252.70	146.86	13.53	3.38
BH-69B	1.00	30.00	27.50	21.50	267.44	150.56	13.53	3.38

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.60	25.20	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.80	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	37.80	50.40	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	12.00	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	59.40	68.40	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	9.39	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	75.45	82.49	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	9.25	10.00	89.54	96.58	4.71	17.74	77.43	95.17	38.07	15.96
6	10.00	11.50	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	10.75	11.50	103.63	110.67	4.71	20.53	88.29	126.56	50.62	23.36
7	11.50	13.00	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	12.25	13.00	117.72	124.76	4.71	23.32	99.16	160.74	64.30	31.54
8	13.00	14.50	1.50	Granular	7.84	0.06	24	-	8.00	9.78	1.00	-	13.75	14.50	130.64	136.53	4.71	25.88	107.74	195.21	78.08	40.43
9	14.50	16.00	1.50	Granular	7.84	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	136.53	136.53	4.71	32.68	222.04	342.19	136.88	51.23
10	16.00	17.50	1.50	Granular	7.84	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	136.53	136.53	4.71	32.68	222.04	374.87	149.95	62.03
11	17.50	19.00	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	18.25	19.00	136.53	136.53	4.71	31.55	196.58	380.96	152.38	72.52
12	19.00	20.50	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	136.53	136.53	4.71	31.55	196.58	412.51	165.00	83.00
13	20.50	22.00	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	136.53	136.53	4.71	31.55	196.58	444.06	177.63	93.49
14	22.00	23.50	1.50	Granular	9.39	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	136.53	136.53	4.71	31.55	197.53	476.58	190.63	103.97
15	23.50	25.00	1.50	Granular	9.39	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	136.53	136.53	4.71	31.55	197.53	508.13	203.25	114.46
16	25.00	26.50	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	25.75	26.50	136.53	136.53	4.71	32.68	223.12	566.39	226.56	125.26
17	26.50	28.00	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	27.25	28.00	136.53	136.53	4.71	32.68	223.12	599.07	239.63	136.06
18	28.00	29.50	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	28.75	29.50	136.53	136.53	4.71	32.68	223.12	631.76	252.70	146.86
19	29.50	30.00	0.50	Granular	9.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	136.53	136.53	1.57	11.27	248.70	668.61	267.44	150.56

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	2.42	1.90	1.80	6.70	6.32	0.172	0.687	11.65	2.91	39.01	18.41	27.96	6.99	93.62	44.17
2	22.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	2.44	1.90	1.80	6.62	6.25	0.166	0.664	12.04	3.01	39.87	18.82	28.90	7.22	95.70	45.17
3	24.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.47	1.90	1.80	6.56	6.19	0.161	0.644	12.42	3.11	40.71	19.22	29.81	7.45	97.71	46.13
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	2.49	1.90	1.80	6.49	6.13	0.156	0.625	12.80	3.20	41.53	19.61	30.71	7.68	99.66	47.06
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	2.51	1.90	1.79	6.43	6.07	0.152	0.608	13.16	3.29	42.32	19.99	31.59	7.90	101.56	47.97
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	2.53	1.90	1.79	6.37	6.02	0.148	0.591	13.53	3.38	43.09	20.36	32.46	8.12	103.41	48.86
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	2.53	1.90	1.79	6.37	6.02	0.148	0.591	13.53	3.38	43.09	20.36	32.46	8.12	103.41	48.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69B	-
Chainage	7+369	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	211.39	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Ground Water Table from OGL	12.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69B	1.20	22.00	19.50	13.50	349.27	157.29	15.21	3.80
BH-69B	1.20	23.50	21.00	15.00	373.39	176.08	15.73	3.93
BH-69B	1.20	25.00	22.50	16.50	396.84	194.87	16.23	4.06
BH-69B	1.20	26.50	24.00	18.00	443.80	214.25	16.72	4.18
BH-69B	1.20	28.00	25.50	19.50	468.09	233.62	17.21	4.30
BH-69B	1.20	29.50	27.00	21.00	492.38	253.00	17.68	4.42
BH-69B	1.20	30.00	27.50	21.50	523.43	259.65	17.68	4.42

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	12.60	25.20	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.80	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	37.80	50.40	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	16.80	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	63.00	75.60	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	19.20	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	90.00	104.40	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	19.20	0.06	24	-	8.00	9.78	1.00	-	9.25	10.00	118.80	133.20	5.65	28.24	158.35	186.59	74.64	23.74
6	10.00	11.50	1.50	Granular	19.20	0.06	24	-	8.00	9.78	1.00	-	10.75	11.50	147.60	162.00	5.65	35.09	190.33	253.66	101.46	35.94
7	11.50	13.00	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	12.25	13.00	169.05	176.09	5.65	40.19	200.63	304.15	121.66	49.57
8	13.00	14.50	1.50	Granular	7.84	0.06	24	-	8.00	9.78	1.00	-	13.75	14.50	181.97	187.86	5.65	43.26	212.85	359.62	143.85	64.06
9	14.50	16.00	1.50	Granular	7.84	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	193.74	199.62	5.65	55.65	465.46	667.88	267.15	82.01
10	16.00	17.50	1.50	Granular	7.84	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	205.50	211.39	5.65	59.03	492.34	753.79	301.52	100.92
11	17.50	19.00	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	18.25	19.00	211.39	211.39	5.65	58.63	435.85	755.93	302.37	119.71
12	19.00	20.50	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	211.39	211.39	5.65	58.63	435.85	814.56	325.82	138.50
13	20.50	22.00	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	211.39	211.39	5.65	58.63	435.85	873.18	349.27	157.29
14	22.00	23.50	1.50	Granular	9.39	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	211.39	211.39	5.65	58.63	437.51	933.47	373.39	176.08
15	23.50	25.00	1.50	Granular	9.39	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	211.39	211.39	5.65	58.63	437.51	992.09	396.84	194.87
16	25.00	26.50	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	25.75	26.50	211.39	211.39	5.65	60.72	494.19	1109.50	443.80	214.25
17	26.50	28.00	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	27.25	28.00	211.39	211.39	5.65	60.72	494.19	1170.22	468.09	233.62
18	28.00	29.50	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	28.75	29.50	211.39	211.39	5.65	60.72	494.19	1230.94	492.38	253.00
19	29.50	30.00	0.50	Granular	9.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	211.39	211.39	1.88	20.94	550.88	1308.57	523.43	259.65

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	2.09	1.92	1.80	7.81	7.34	0.131	0.526	15.21	3.80	59.43	27.90	36.51	9.13	142.63	66.95
2	22.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	2.11	1.92	1.80	7.73	7.26	0.127	0.509	15.73	3.93	60.76	28.53	37.74	9.44	145.81	68.48
3	24.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	2.13	1.92	1.80	7.65	7.18	0.123	0.493	16.23	4.06	62.04	29.15	38.95	9.74	148.90	69.95
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	2.15	1.92	1.80	7.57	7.12	0.120	0.478	16.72	4.18	63.30	29.75	40.13	10.03	151.91	71.39
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	2.17	1.92	1.80	7.50	7.05	0.116	0.465	17.21	4.30	64.51	30.33	41.30	10.32	154.83	72.79
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	2.19	1.91	1.80	7.43	6.99	0.113	0.452	17.68	4.42	65.70	30.90	42.44	10.61	157.68	74.15
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	2.19	1.91	1.80	7.43	6.99	0.113	0.452	17.68	4.42	65.70	30.90	42.44	10.61	157.68	74.15

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-70	-
Chainage	7+487	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	158.44	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	9.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-70	1.00	22.00	19.50	15.00	216.40	111.74	11.26	2.82
BH-70	1.00	23.50	21.00	16.50	231.05	123.65	12.01	3.00
BH-70	1.00	25.00	22.50	18.00	245.69	135.55	12.01	3.00
BH-70	1.00	26.50	24.00	19.50	272.69	147.82	12.01	3.00
BH-70	1.00	28.00	25.50	21.00	287.86	160.09	12.38	3.10
BH-70	1.00	29.50	27.00	22.50	303.03	172.35	12.74	3.19
BH-70	1.00	30.00	27.50	23.00	320.09	176.57	12.74	3.19

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.06	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.80	0.06	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	16.80	0.06	23	-	6.00	8.68	1.00	-	6.25	7.00	63.00	75.60	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	19.20	0.06	23	-	6.00	8.68	1.00	-	7.75	8.50	90.00	104.40	4.71	17.09	76.00	93.09	37.24	14.13
5	8.50	10.00	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	9.25	10.00	111.45	118.49	4.71	21.16	83.33	121.57	48.63	21.70
6	10.00	11.50	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	10.75	11.50	125.54	132.58	4.71	23.83	92.97	155.05	62.02	30.03
7	11.50	13.00	1.50	Granular	9.39	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	139.63	146.67	4.71	32.27	211.78	306.13	122.45	40.71
8	13.00	14.50	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	152.55	158.44	4.71	35.26	227.34	356.95	142.78	52.23
9	14.50	16.00	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	15.25	16.00	158.44	158.44	4.71	36.62	227.34	393.57	157.43	64.14
10	16.00	17.50	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	16.75	17.50	158.44	158.44	4.71	36.62	227.34	430.18	172.07	76.04
11	17.50	19.00	1.50	Granular	7.84	0.05	28	-	15.70	17.82	1.00	-	18.25	19.00	158.44	158.44	4.71	36.62	227.34	466.80	186.72	87.94
12	19.00	20.50	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	19.75	20.50	158.44	158.44	4.71	36.62	228.30	504.38	201.75	99.84
13	20.50	22.00	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	21.25	22.00	158.44	158.44	4.71	36.62	228.30	541.00	216.40	111.74
14	22.00	23.50	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	22.75	23.50	158.44	158.44	4.71	36.62	228.30	577.61	231.05	123.65
15	23.50	25.00	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	24.25	25.00	158.44	158.44	4.71	36.62	228.30	614.23	245.69	135.55
16	25.00	26.50	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	25.75	26.50	158.44	158.44	4.71	37.93	257.88	681.73	272.69	147.82
17	26.50	28.00	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	27.25	28.00	158.44	158.44	4.71	37.93	257.88	719.66	287.86	160.09
18	28.00	29.50	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	28.75	29.50	158.44	158.44	4.71	37.93	257.88	757.58	303.03	172.35
19	29.50	30.00	0.50	Granular	9.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	158.44	158.44	1.57	13.08	287.46	800.24	320.09	176.57

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.99	1.93	1.80	6.77	6.35	0.178	0.710	11.26	2.82	38.14	17.87	27.03	6.76	91.53	42.89
2	22.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.166	0.666	12.01	3.00	39.82	18.67	28.84	7.21	95.56	44.81
3	24.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.166	0.666	12.01	3.00	39.82	18.67	28.84	7.21	95.56	44.81
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.166	0.666	12.01	3.00	39.82	18.67	28.84	7.21	95.56	44.81
5	27.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	2.05	1.92	1.80	6.56	6.16	0.162	0.646	12.38	3.10	40.62	19.06	29.71	7.43	97.50	45.74
6	28.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	2.07	1.92	1.80	6.50	6.10	0.157	0.628	12.74	3.19	41.41	19.43	30.58	7.64	99.38	46.64
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	2.07	1.92	1.80	6.50	6.10	0.157	0.628	12.74	3.19	41.41	19.43	30.58	7.64	99.38	46.64

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-70	-
Chainage	7+487	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	181.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	9.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-70	1.20	22.00	19.50	15.00	311.74	147.21	14.65	3.66
BH-70	1.20	23.50	21.00	16.50	331.93	163.71	15.63	3.91
BH-70	1.20	25.00	22.50	18.00	352.11	180.22	15.63	3.91
BH-70	1.20	26.50	24.00	19.50	392.61	197.23	15.63	3.91
BH-70	1.20	28.00	25.50	21.00	413.51	214.24	16.11	4.03
BH-70	1.20	29.50	27.00	22.50	434.42	231.25	16.58	4.15
BH-70	1.20	30.00	27.50	23.00	461.22	237.09	16.58	4.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.80	0.06	23	-	6.00	8.68	1.00	-	3.25	4.00	12.60	25.20	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.80	0.06	23	-	6.00	8.68	1.00	-	4.75	5.50	37.80	50.40	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	16.80	0.06	23	-	6.00	8.68	1.00	-	6.25	7.00	63.00	75.60	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	19.20	0.06	23	-	6.00	8.68	1.00	-	7.75	8.50	90.00	104.40	5.65	20.50	110.75	131.25	52.50	19.20
5	8.50	10.00	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	9.25	10.00	111.45	118.49	5.65	25.39	120.63	166.52	66.61	28.68
6	10.00	11.50	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	10.75	11.50	125.54	132.58	5.65	28.60	134.52	209.01	83.60	39.07
7	11.50	13.00	1.50	Granular	9.39	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	139.63	146.67	5.65	38.72	306.64	419.86	167.94	52.28
8	13.00	14.50	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	152.55	158.44	5.65	42.31	328.77	484.30	193.72	66.51
9	14.50	16.00	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	15.25	16.00	164.32	170.20	5.65	45.57	352.56	553.66	221.46	81.64
10	16.00	17.50	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	16.75	17.50	176.08	181.97	5.65	48.84	376.36	626.29	250.52	97.69
11	17.50	19.00	1.50	Granular	7.84	0.05	28	-	15.70	17.82	1.00	-	18.25	19.00	181.97	181.97	5.65	50.47	376.36	676.76	270.70	114.20
12	19.00	20.50	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	19.75	20.50	181.97	181.97	5.65	50.47	378.01	728.88	291.55	130.70
13	20.50	22.00	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	21.25	22.00	181.97	181.97	5.65	50.47	378.01	779.35	311.74	147.21
14	22.00	23.50	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	22.75	23.50	181.97	181.97	5.65	50.47	378.01	829.81	331.93	163.71
15	23.50	25.00	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	24.25	25.00	181.97	181.97	5.65	50.47	378.01	880.28	352.11	180.22
16	25.00	26.50	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	25.75	26.50	181.97	181.97	5.65	52.27	426.98	981.52	392.61	197.23
17	26.50	28.00	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	27.25	28.00	181.97	181.97	5.65	52.27	426.98	1033.79	413.51	214.24
18	28.00	29.50	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	28.75	29.50	181.97	181.97	5.65	52.27	426.98	1086.06	434.42	231.25
19	29.50	30.00	0.50	Granular	9.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	181.97	181.97	1.88	18.02	475.95	1153.05	461.22	237.09

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.72	1.94	1.81	7.91	7.37	0.137	0.546	14.65	3.66	57.95	26.99	35.16	8.79	139.08	64.77
2	22.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.76	1.94	1.81	7.74	7.22	0.128	0.512	15.63	3.91	60.52	28.21	37.52	9.38	145.24	67.70
3	24.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.76	1.94	1.81	7.74	7.22	0.128	0.512	15.63	3.91	60.52	28.21	37.52	9.38	145.24	67.70
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.76	1.94	1.81	7.74	7.22	0.128	0.512	15.63	3.91	60.52	28.21	37.52	9.38	145.24	67.70
5	27.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.77	1.94	1.81	7.66	7.15	0.124	0.497	16.11	4.03	61.75	28.79	38.67	9.67	148.19	69.11
6	28.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.79	1.94	1.81	7.59	7.08	0.121	0.482	16.58	4.15	62.94	29.36	39.80	9.95	151.07	70.47
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.79	1.94	1.81	7.59	7.08	0.121	0.482	16.58	4.15	62.94	29.36	39.80	9.95	151.07	70.47

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-61	-
Chainage	6+639	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	105.60	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-61	1.00	20.50	18.00	18.00	144.79	75.02	11.85	2.96
BH-61	1.00	22.00	19.50	19.50	163.24	83.99	12.12	3.03
BH-61	1.00	23.50	21.00	21.00	173.70	92.96	12.12	3.03
BH-61	1.00	25.00	22.50	22.50	184.16	101.93	12.39	3.10
BH-61	1.00	26.50	24.00	24.00	194.62	110.91	12.65	3.16
BH-61	1.00	28.00	25.50	25.50	205.08	119.88	12.65	3.16
BH-61	1.00	29.50	27.00	27.00	215.54	128.85	12.91	3.23
BH-61	1.00	31.00	28.50	28.50	226.00	137.82	12.91	3.23
BH-61	1.00	32.50	30.00	30.00	236.46	146.79	12.91	3.23
BH-61	1.00	34.00	31.50	31.50	246.92	155.76	12.91	3.23
BH-61	1.00	35.00	32.50	32.50	253.89	161.74	12.91	3.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	4.71	1.00	8.83	9.83	3.93	4.68
2	4.00	5.50	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	4.71	2.99	16.01	20.00	8.00	7.16
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	4.71	5.63	36.00	45.61	18.25	10.39
4	7.00	8.50	1.50	Granular	10.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	39.27	47.06	4.71	8.43	53.81	71.85	28.74	14.40
5	8.50	10.00	1.50	Granular	10.39	0.11	26	-	11.90	13.19	1.00	-	9.25	10.00	54.86	62.65	4.71	11.77	70.02	99.83	39.93	19.34
6	10.00	11.50	1.50	Granular	10.39	0.11	26	-	11.90	13.19	1.00	-	10.75	11.50	70.45	78.24	4.71	15.12	86.23	131.16	52.46	25.22
7	11.50	13.00	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	12.25	13.00	86.04	93.83	4.71	19.17	120.32	184.42	73.77	32.24
8	13.00	14.50	1.50	Granular	7.84	0.09	27	-	13.80	15.50	1.00	-	13.75	14.50	99.71	105.60	4.71	22.22	133.31	219.64	87.85	40.11
9	14.50	16.00	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	105.60	105.60	4.71	25.28	172.97	284.57	113.83	48.84
10	16.00	17.50	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	105.60	105.60	4.71	25.28	172.97	309.85	123.94	57.57
11	17.50	19.00	1.50	Granular	7.84	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	105.60	105.60	4.71	25.28	172.97	335.13	134.05	66.30
12	19.00	20.50	1.50	Granular	10.09	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	105.60	105.60	4.71	25.28	174.53	361.96	144.79	75.02
13	20.50	22.00	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	21.25	22.00	105.60	105.60	4.71	26.15	194.53	408.11	163.24	83.99
14	22.00	23.50	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	22.75	23.50	105.60	105.60	4.71	26.15	194.53	434.26	173.70	92.96
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	105.60	105.60	4.71	26.15	194.53	460.41	184.16	101.93
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	105.60	105.60	4.71	26.15	194.53	486.56	194.62	110.91
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	105.60	105.60	4.71	26.15	194.53	512.71	205.08	119.88
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	105.60	105.60	4.71	26.15	194.53	538.85	215.54	128.85
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	105.60	105.60	4.71	26.15	194.53	565.00	226.00	137.82
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	105.60	105.60	4.71	26.15	194.53	591.15	236.46	146.79
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	105.60	105.60	4.71	26.15	194.53	617.30	246.92	155.76
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	105.60	105.60	3.14	17.43	194.53	634.73	253.89	161.74

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	0.77	2.05	1.84	6.66	6.00	0.169	0.675	11.85	2.96	39.46	17.76	28.45	7.11	94.70	42.63
2	22.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
3	23.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	0.77	2.05	1.84	6.61	5.95	0.165	0.660	12.12	3.03	40.05	18.04	29.09	7.27	96.13	43.29
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
6	28.00	31	2.96E+07	4.91E-02	4.42E+03	3.19	0.78	2.05	1.84	6.52	5.87	0.158	0.632	12.65	3.16	41.21	18.56	30.36	7.59	98.90	44.56
7	29.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	31.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	32.50	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	34.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17
7	35.00	32	2.96E+07	4.91E-02	4.57E+03	3.17	0.79	2.04	1.84	6.47	5.83	0.155	0.620	12.91	3.23	41.77	18.82	30.98	7.74	100.24	45.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-61	-
Chainage	6+639	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	129.13	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-61	1.20	20.50	18.00	18.00	220.92	101.11	15.51	3.88
BH-61	1.20	22.00	19.50	19.50	250.34	114.23	15.86	3.96
BH-61	1.20	23.50	21.00	21.00	265.69	127.35	15.86	3.96
BH-61	1.20	25.00	22.50	22.50	281.04	140.47	16.20	4.05
BH-61	1.20	26.50	24.00	24.00	296.39	153.59	16.54	4.14
BH-61	1.20	28.00	25.50	25.50	311.74	166.71	16.54	4.14
BH-61	1.20	29.50	27.00	27.00	327.08	179.83	16.88	4.22
BH-61	1.20	31.00	28.50	28.50	342.43	192.94	16.88	4.22
BH-61	1.20	32.50	30.00	30.00	357.78	206.06	16.88	4.22
BH-61	1.20	34.00	31.50	31.50	373.13	219.18	16.88	4.22
BH-61	1.20	35.00	32.50	32.50	383.36	227.93	16.88	4.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	5.65	1.19	13.20	14.39	5.76	6.67
2	4.00	5.50	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	5.65	3.58	23.54	28.32	11.33	10.05
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	5.65	6.75	52.79	64.32	25.73	14.31
4	7.00	8.50	1.50	Granular	10.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	39.27	47.06	5.65	10.11	78.89	100.53	40.21	19.52
5	8.50	10.00	1.50	Granular	10.39	0.11	26	-	11.90	13.19	1.00	-	9.25	10.00	54.86	62.65	5.65	14.13	102.23	138.00	55.20	25.85
6	10.00	11.50	1.50	Granular	10.39	0.11	26	-	11.90	13.19	1.00	-	10.75	11.50	70.45	78.24	5.65	18.14	125.58	179.49	71.80	33.30
7	11.50	13.00	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	12.25	13.00	86.04	93.83	5.65	23.01	174.89	251.81	100.72	42.12
8	13.00	14.50	1.50	Granular	7.84	0.09	27	-	13.80	15.50	1.00	-	13.75	14.50	99.71	105.60	5.65	26.67	193.19	296.79	118.71	51.96
9	14.50	16.00	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	111.48	117.36	5.65	32.02	277.52	413.14	165.25	63.31
10	16.00	17.50	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	123.24	129.13	5.65	35.40	304.40	475.42	190.17	75.59
11	17.50	19.00	1.50	Granular	7.84	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	129.13	129.13	5.65	37.09	304.40	512.51	205.00	88.35
12	19.00	20.50	1.50	Granular	10.09	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	129.13	129.13	5.65	37.09	307.10	552.30	220.92	101.11
13	20.50	22.00	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	21.25	22.00	129.13	129.13	5.65	38.37	342.29	625.86	250.34	114.23
14	22.00	23.50	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	22.75	23.50	129.13	129.13	5.65	38.37	342.29	664.23	265.69	127.35
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	129.13	129.13	5.65	38.37	342.29	702.60	281.04	140.47
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	129.13	129.13	5.65	38.37	342.29	740.97	296.39	153.59
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	129.13	129.13	5.65	38.37	342.29	779.34	311.74	166.71
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	129.13	129.13	5.65	38.37	342.29	817.71	327.08	179.83
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	129.13	129.13	5.65	38.37	342.29	856.08	342.43	192.94
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	129.13	129.13	5.65	38.37	342.29	894.45	357.78	206.06
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	129.13	129.13	5.65	38.37	342.29	932.82	373.13	219.18
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	129.13	129.13	3.77	25.58	342.29	958.40	383.36	227.93

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	0.66	2.06	1.85	7.76	6.95	0.129	0.516	15.51	3.88	60.19	26.96	37.22	9.30	144.46	64.70
2	22.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
3	23.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	0.67	2.06	1.85	7.71	6.90	0.126	0.505	15.86	3.96	61.09	27.37	38.06	9.51	146.62	65.69
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
6	28.00	31	2.96E+07	1.02E-01	4.42E+03	3.69	0.68	2.06	1.85	7.60	6.81	0.121	0.484	16.54	4.14	62.85	28.17	39.71	9.93	150.83	67.61
7	29.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	31.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	32.50	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	34.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54
7	35.00	32	2.96E+07	1.02E-01	4.57E+03	3.66	0.68	2.06	1.85	7.55	6.77	0.118	0.474	16.88	4.22	63.70	28.56	40.52	10.13	152.88	68.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-62	-
Chainage	6+726	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	100.12	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-62	1.00	20.50	18.00	16.50	139.58	73.81	12.32	3.08
BH-62	1.00	22.00	19.50	18.00	157.10	82.40	12.32	3.08
BH-62	1.00	23.50	21.00	19.50	167.02	90.99	12.32	3.08
BH-62	1.00	25.00	22.50	21.00	176.93	99.59	12.63	3.16
BH-62	1.00	26.50	24.00	22.50	186.85	108.18	12.93	3.23
BH-62	1.00	28.00	25.50	24.00	196.77	116.77	12.93	3.23
BH-62	1.00	29.50	27.00	25.50	206.78	125.36	13.23	3.31
BH-62	1.00	31.00	28.50	27.00	216.69	133.95	13.23	3.31
BH-62	1.00	32.50	30.00	28.50	226.61	142.54	13.23	3.31
BH-62	1.00	34.00	31.50	30.00	236.53	151.13	13.23	3.31
BH-62	1.00	35.00	32.50	31.00	243.14	156.86	13.52	3.38

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.04	24	-	8.00	9.78	1.00	-	3.25	4.00	6.11	12.22	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.14	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	18.32	24.43	4.71	3.63	21.40	25.03	10.01	7.06
3	5.50	7.00	1.50	Granular	8.14	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	30.54	36.65	4.71	6.05	30.82	40.50	16.20	10.41
4	7.00	8.50	1.50	Granular	8.14	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	42.75	48.86	4.71	8.47	40.24	58.39	23.36	14.43
5	8.50	10.00	1.50	Granular	6.99	0.09	29	-	17.60	20.13	1.00	-	9.25	10.00	54.11	59.35	4.71	12.95	99.01	130.11	52.04	19.70
6	10.00	11.50	1.50	Granular	6.99	0.09	29	-	17.60	20.13	1.00	-	10.75	11.50	64.60	69.84	4.71	15.46	115.66	162.22	64.89	25.68
7	11.50	13.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	77.41	84.98	4.71	18.53	141.83	206.92	82.77	32.52
8	13.00	14.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	92.55	100.12	4.71	22.15	165.85	253.09	101.24	40.37
9	14.50	16.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	100.12	100.12	4.71	23.97	165.85	277.06	110.82	48.73
10	16.00	17.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	100.12	100.12	4.71	23.97	165.85	301.02	120.41	57.09
11	17.50	19.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	100.12	100.12	4.71	23.97	165.85	324.99	130.00	65.45
12	19.00	20.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	100.12	100.12	4.71	23.97	165.85	348.96	139.58	73.81
13	20.50	22.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	21.25	22.00	100.12	100.12	4.71	24.79	184.85	392.75	157.10	82.40
14	22.00	23.50	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	22.75	23.50	100.12	100.12	4.71	24.79	184.85	417.54	167.02	90.99
15	23.50	25.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	24.25	25.00	100.12	100.12	4.71	24.79	184.85	442.34	176.93	99.59
16	25.00	26.50	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	25.75	26.50	100.12	100.12	4.71	24.79	184.85	467.13	186.85	108.18
17	26.50	28.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	27.25	28.00	100.12	100.12	4.71	24.79	184.85	491.92	196.77	116.77
18	28.00	29.50	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	28.75	29.50	100.12	100.12	4.71	24.79	185.08	516.94	206.78	125.36
19	29.50	31.00	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	30.25	31.00	100.12	100.12	4.71	24.79	185.08	541.74	216.69	133.95
20	31.00	32.50	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	31.75	32.50	100.12	100.12	4.71	24.79	185.08	566.53	226.61	142.54
21	32.50	34.00	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	33.25	34.00	100.12	100.12	4.71	24.79	185.08	591.32	236.53	151.13
22	34.00	35.00	1.00	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	34.50	35.00	100.12	100.12	3.14	16.53	185.08	607.85	243.14	156.86

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
2	22.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
3	23.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
4	25.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.23	1.99	1.83	6.47	5.94	0.155	0.619	12.93	3.23	41.81	19.19	31.03	7.76	100.35	46.05
7	29.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	31.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	34.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.24	1.99	1.82	6.42	5.89	0.151	0.605	13.23	3.31	42.45	19.49	31.74	7.94	101.88	46.76
7	35.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.25	1.99	1.82	6.37	5.85	0.148	0.592	13.52	3.38	43.08	19.78	32.45	8.11	103.38	47.47

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-62	-
Chainage	6+726	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	130.40	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-62	1.20	20.50	18.00	16.50	222.34	101.29	16.03	4.01
BH-62	1.20	22.00	19.50	18.00	252.05	114.52	16.03	4.01
BH-62	1.20	23.50	21.00	19.50	267.55	127.74	16.03	4.01
BH-62	1.20	25.00	22.50	21.00	283.05	140.96	16.43	4.11
BH-62	1.20	26.50	24.00	22.50	298.54	154.19	16.82	4.20
BH-62	1.20	28.00	25.50	24.00	314.04	167.41	16.82	4.20
BH-62	1.20	29.50	27.00	25.50	329.70	180.64	17.20	4.30
BH-62	1.20	31.00	28.50	27.00	345.20	193.86	17.20	4.30
BH-62	1.20	32.50	30.00	28.50	360.70	207.09	17.20	4.30
BH-62	1.20	34.00	31.50	30.00	376.20	220.31	17.20	4.30
BH-62	1.20	35.00	32.50	31.00	386.54	229.13	17.58	4.40

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.04	24	-	8.00	9.78	1.00	-	3.25	4.00	6.11	12.22	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.14	0.04	24	-	8.00	9.78	1.00	-	4.75	5.50	18.32	24.43	5.65	4.36	31.56	35.92	14.37	9.93
3	5.50	7.00	1.50	Granular	8.14	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	30.54	36.65	5.65	7.26	45.12	56.74	22.70	14.34
4	7.00	8.50	1.50	Granular	8.14	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	42.75	48.86	5.65	10.16	58.69	80.46	32.19	19.56
5	8.50	10.00	1.50	Granular	6.99	0.09	29	-	17.60	20.13	1.00	-	9.25	10.00	54.11	59.35	5.65	15.54	143.97	181.29	72.52	26.28
6	10.00	11.50	1.50	Granular	6.99	0.09	29	-	17.60	20.13	1.00	-	10.75	11.50	64.60	69.84	5.65	18.55	167.94	223.82	89.53	33.85
7	11.50	13.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	12.25	13.00	77.41	84.98	5.65	22.24	206.25	284.36	113.74	42.45
8	13.00	14.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	13.75	14.50	92.55	100.12	5.65	26.58	240.83	345.53	138.21	52.27
9	14.50	16.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	107.69	115.26	5.65	30.93	275.42	411.05	164.42	63.31
10	16.00	17.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	122.83	130.40	5.65	35.28	310.01	480.93	192.37	75.56
11	17.50	19.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	130.40	130.40	5.65	37.46	310.01	518.38	207.35	88.43
12	19.00	20.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	130.40	130.40	5.65	37.46	310.01	555.84	222.34	101.29
13	20.50	22.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	21.25	22.00	130.40	130.40	5.65	38.75	345.54	630.12	252.05	114.52
14	22.00	23.50	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	22.75	23.50	130.40	130.40	5.65	38.75	345.54	668.86	267.55	127.74
15	23.50	25.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	24.25	25.00	130.40	130.40	5.65	38.75	345.54	707.61	283.05	140.96
16	25.00	26.50	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	25.75	26.50	130.40	130.40	5.65	38.75	345.54	746.36	298.54	154.19
17	26.50	28.00	1.50	Granular	10.09	0.12	30	-	19.50	22.44	1.00	-	27.25	28.00	130.40	130.40	5.65	38.75	345.54	785.11	314.04	167.41
18	28.00	29.50	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	28.75	29.50	130.40	130.40	5.65	38.75	345.94	824.26	329.70	180.64
19	29.50	31.00	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	30.25	31.00	130.40	130.40	5.65	38.75	345.94	863.01	345.20	193.86
20	31.00	32.50	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	31.75	32.50	130.40	130.40	5.65	38.75	345.94	901.76	360.70	207.09
21	32.50	34.00	1.50	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	33.25	34.00	130.40	130.40	5.65	38.75	345.94	940.51	376.20	220.31
22	34.00	35.00	1.00	Granular	10.39	0.12	30	-	19.50	22.44	1.00	-	34.50	35.00	130.40	130.40	3.77	25.83	345.94	966.34	386.54	229.13

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
2	22.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
3	23.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
4	25.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.06	2.01	1.83	7.56	6.89	0.119	0.476	16.82	4.20	63.53	28.97	40.36	10.09	152.48	69.53
7	29.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	31.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	34.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.07	2.01	1.83	7.50	6.84	0.116	0.465	17.20	4.30	64.50	29.42	41.28	10.32	154.80	70.61
7	35.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.08	2.01	1.83	7.44	6.79	0.114	0.455	17.58	4.40	65.45	29.86	42.20	10.55	157.07	71.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-63	-
Chainage	6+838	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	115.87	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-63	1.00	20.50	18.00	18.00	170.58	82.32	12.39	3.10
BH-63	1.00	22.00	19.50	19.50	182.06	92.01	12.39	3.10
BH-63	1.00	23.50	21.00	21.00	193.53	101.69	12.39	3.10
BH-63	1.00	25.00	22.50	22.50	205.01	111.37	12.39	3.10
BH-63	1.00	26.50	24.00	24.00	216.40	121.06	12.39	3.10
BH-63	1.00	28.00	25.50	25.50	227.87	130.74	12.39	3.10
BH-63	1.00	29.50	27.00	27.00	239.35	140.42	12.39	3.10
BH-63	1.00	31.00	28.50	28.50	250.83	150.11	12.39	3.10
BH-63	1.00	32.50	30.00	30.00	262.30	159.79	12.39	3.10
BH-63	1.00	34.00	31.50	31.50	273.78	169.47	12.39	3.10
BH-63	1.00	35.00	32.50	32.50	281.43	175.93	12.39	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.39	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	7.05	14.09	4.71	1.34	11.87	13.20	5.28	4.77
2	4.00	5.50	1.50	Granular	9.39	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	21.14	28.18	4.71	4.01	21.51	26.86	10.74	7.55
3	5.50	7.00	1.50	Granular	9.39	0.08	26	-	11.90	13.19	1.00	-	6.25	7.00	35.23	42.27	4.71	7.56	48.36	61.27	24.51	11.31
4	7.00	8.50	1.50	Granular	9.39	0.08	26	-	11.90	13.19	1.00	-	7.75	8.50	49.32	56.36	4.71	10.58	63.01	86.50	34.60	15.92
5	8.50	10.00	1.50	Granular	9.39	0.08	26	-	11.90	13.19	1.00	-	9.25	10.00	63.41	70.45	4.71	13.61	77.66	114.76	45.90	21.38
6	10.00	11.50	1.50	Granular	10.09	0.08	26	-	11.90	13.19	1.00	-	10.75	11.50	78.02	85.59	4.71	16.74	93.73	147.58	59.03	27.72
7	11.50	13.00	1.50	Granular	10.09	0.10	27	-	13.80	15.50	1.00	-	12.25	13.00	93.16	100.73	4.71	20.76	128.59	203.20	81.28	35.18
8	13.00	14.50	1.50	Granular	10.09	0.10	27	-	13.80	15.50	1.00	-	13.75	14.50	108.30	115.87	4.71	24.14	147.09	245.83	98.33	43.59
9	14.50	16.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	15.25	16.00	115.87	115.87	4.71	28.69	212.71	340.14	136.06	53.27
10	16.00	17.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	16.75	17.50	115.87	115.87	4.71	28.69	212.71	368.83	147.53	62.96
11	17.50	19.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	115.87	115.87	4.71	28.69	212.71	397.53	159.01	72.64
12	19.00	20.50	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	115.87	115.87	4.71	28.69	212.94	426.45	170.58	82.32
13	20.50	22.00	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	115.87	115.87	4.71	28.69	212.94	455.14	182.06	92.01
14	22.00	23.50	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	115.87	115.87	4.71	28.69	212.94	483.84	193.53	101.69
15	23.50	25.00	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	115.87	115.87	4.71	28.69	212.94	512.53	205.01	111.37
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	115.87	115.87	4.71	28.69	212.71	540.99	216.40	121.06
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	115.87	115.87	4.71	28.69	212.71	569.68	227.87	130.74
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	115.87	115.87	4.71	28.69	212.71	598.38	239.35	140.42
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	115.87	115.87	4.71	28.69	212.71	627.07	250.83	150.11
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	115.87	115.87	4.71	28.69	212.71	655.76	262.30	159.79
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	115.87	115.87	4.71	28.69	212.71	684.45	273.78	169.47
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	115.87	115.87	3.14	19.13	212.71	703.58	281.43	175.93

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
2	22.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
3	23.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
4	25.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
5	26.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
6	28.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	29.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	31.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	32.50	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	34.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93
7	35.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	0.78	2.05	1.84	6.56	5.91	0.161	0.646	12.39	3.10	40.64	18.30	29.73	7.43	97.53	43.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-63	-
Chainage	6+838	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	146.15	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-63	1.20	20.50	18.00	18.00	267.71	111.76	16.20	4.05
BH-63	1.20	22.00	19.50	19.50	285.08	126.29	16.20	4.05
BH-63	1.20	23.50	21.00	21.00	302.45	140.83	16.20	4.05
BH-63	1.20	25.00	22.50	22.50	319.82	155.36	16.20	4.05
BH-63	1.20	26.50	24.00	24.00	337.03	169.90	16.20	4.05
BH-63	1.20	28.00	25.50	25.50	354.40	184.43	16.20	4.05
BH-63	1.20	29.50	27.00	27.00	371.78	198.97	16.20	4.05
BH-63	1.20	31.00	28.50	28.50	389.15	213.50	16.20	4.05
BH-63	1.20	32.50	30.00	30.00	406.52	228.04	16.20	4.05
BH-63	1.20	34.00	31.50	31.50	423.89	242.57	16.20	4.05
BH-63	1.20	35.00	32.50	32.50	435.47	252.26	16.20	4.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	9.39	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	7.05	14.09	5.65	1.60	17.73	19.33	7.73	6.78
2	4.00	5.50	1.50	Granular	9.39	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	21.14	28.18	5.65	4.81	31.61	38.03	15.21	10.51
3	5.50	7.00	1.50	Granular	9.39	0.08	26	-	11.90	13.19	1.00	-	6.25	7.00	35.23	42.27	5.65	9.07	70.91	86.40	34.56	15.42
4	7.00	8.50	1.50	Granular	9.39	0.08	26	-	11.90	13.19	1.00	-	7.75	8.50	49.32	56.36	5.65	12.70	92.00	120.20	48.08	21.35
5	8.50	10.00	1.50	Granular	9.39	0.08	26	-	11.90	13.19	1.00	-	9.25	10.00	63.41	70.45	5.65	16.33	113.10	157.62	63.05	28.30
6	10.00	11.50	1.50	Granular	10.09	0.08	26	-	11.90	13.19	1.00	-	10.75	11.50	78.02	85.59	5.65	20.09	136.34	200.95	80.38	36.30
7	11.50	13.00	1.50	Granular	10.09	0.10	27	-	13.80	15.50	1.00	-	12.25	13.00	93.16	100.73	5.65	24.91	186.75	276.28	110.51	45.65
8	13.00	14.50	1.50	Granular	10.09	0.10	27	-	13.80	15.50	1.00	-	13.75	14.50	108.30	115.87	5.65	28.96	213.39	331.88	132.75	56.14
9	14.50	16.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	15.25	16.00	123.44	131.01	5.65	36.68	347.09	502.26	200.91	68.78
10	16.00	17.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	16.75	17.50	138.58	146.15	5.65	41.18	385.65	582.01	232.80	82.69
11	17.50	19.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	146.15	146.15	5.65	43.43	385.65	625.44	250.17	97.22
12	19.00	20.50	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	146.15	146.15	5.65	43.43	386.05	669.26	267.71	111.76
13	20.50	22.00	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	146.15	146.15	5.65	43.43	386.05	712.69	285.08	126.29
14	22.00	23.50	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	146.15	146.15	5.65	43.43	386.05	756.12	302.45	140.83
15	23.50	25.00	1.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	146.15	146.15	5.65	43.43	386.05	799.55	319.82	155.36
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	146.15	146.15	5.65	43.43	385.65	842.58	337.03	169.90
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	146.15	146.15	5.65	43.43	385.65	886.01	354.40	184.43
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	146.15	146.15	5.65	43.43	385.65	929.44	371.78	198.97
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	146.15	146.15	5.65	43.43	385.65	972.87	389.15	213.50
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	146.15	146.15	5.65	43.43	385.65	1016.30	406.52	228.04
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	146.15	146.15	5.65	43.43	385.65	1059.73	423.89	242.57
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	146.15	146.15	3.77	28.95	385.65	1088.68	435.47	252.26

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
2	22.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
3	23.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
4	25.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
5	26.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
6	28.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	29.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	31.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	32.50	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	34.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66
7	35.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	0.67	2.06	1.85	7.65	6.86	0.123	0.494	16.20	4.05	61.98	27.77	38.89	9.72	148.75	66.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-64	-
Chainage	6+925	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	106.95	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-64	1.00	20.50	18.00	15.00	128.41	74.30	13.16	3.29
BH-64	1.00	22.00	19.50	16.50	163.30	83.36	13.48	3.37
BH-64	1.00	23.50	21.00	18.00	173.89	92.43	13.48	3.37
BH-64	1.00	25.00	22.50	19.50	184.48	101.49	13.80	3.45
BH-64	1.00	26.50	24.00	21.00	195.08	110.55	13.80	3.45
BH-64	1.00	28.00	25.50	22.50	205.67	119.62	13.80	3.45
BH-64	1.00	29.50	27.00	24.00	216.26	128.68	14.12	3.53
BH-64	1.00	31.00	28.50	25.50	226.86	137.75	14.12	3.53
BH-64	1.00	32.50	30.00	27.00	237.45	146.81	14.12	3.53
BH-64	1.00	34.00	31.50	28.50	248.04	155.88	14.43	3.61
BH-64	1.00	35.00	32.50	29.50	255.10	161.92	14.43	3.61

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	6.11	12.22	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.14	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	18.32	24.43	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	8.14	0.06	25	-	10.00	10.88	1.00	-	6.25	7.00	30.54	36.65	4.71	6.30	34.64	40.94	16.37	9.46
4	7.00	8.50	1.50	Granular	8.14	0.06	25	-	10.00	10.88	1.00	-	7.75	8.50	42.75	48.86	4.71	8.82	45.11	60.24	24.09	13.58
5	8.50	10.00	1.50	Granular	8.14	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	54.97	61.08	4.71	12.70	90.81	118.63	47.45	18.79
6	10.00	11.50	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	68.65	76.22	4.71	15.87	113.27	156.97	62.79	24.88
7	11.50	13.00	1.50	Granular	10.09	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	83.79	91.36	4.71	19.36	134.54	197.59	79.04	31.95
8	13.00	14.50	1.50	Granular	10.39	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	99.15	106.95	4.71	22.92	156.61	242.59	97.04	40.02
9	14.50	16.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	106.95	106.95	4.71	25.60	176.88	288.46	115.38	48.83
10	16.00	17.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	106.95	106.95	4.71	25.60	176.88	314.06	125.62	57.65
11	17.50	19.00	1.50	Granular	10.39	0.13	27	-	13.80	15.50	1.00	-	18.25	19.00	106.95	106.95	4.71	23.83	136.35	297.35	118.94	65.97
12	19.00	20.50	1.50	Granular	10.09	0.13	27	-	13.80	15.50	1.00	-	19.75	20.50	106.95	106.95	4.71	23.83	136.18	321.03	128.41	74.30
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	106.95	106.95	4.71	26.48	196.92	408.24	163.30	83.36
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	106.95	106.95	4.71	26.48	196.92	434.73	173.89	92.43
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	106.95	106.95	4.71	26.48	196.92	461.21	184.48	101.49
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	106.95	106.95	4.71	26.48	196.92	487.69	195.08	110.55
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	106.95	106.95	4.71	26.48	196.92	514.17	205.67	119.62
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	106.95	106.95	4.71	26.48	196.92	540.66	216.26	128.68
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	106.95	106.95	4.71	26.48	196.92	567.14	226.86	137.75
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	106.95	106.95	4.71	26.48	196.92	593.62	237.45	146.81
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	106.95	106.95	4.71	26.48	196.92	620.11	248.04	155.88
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	106.95	106.95	3.14	17.66	196.92	637.76	255.10	161.92

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_r/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21
2	22.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.68	1.95	1.81	6.38	5.94	0.148	0.593	13.48	3.37	42.99	20.00	32.35	8.09	103.19	48.01
3	23.50	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.68	1.95	1.81	6.38	5.94	0.148	0.593	13.48	3.37	42.99	20.00	32.35	8.09	103.19	48.01
4	25.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
5	26.50	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
6	28.00	28	2.96E+07	4.91E-02	3.99E+03	3.25	1.69	1.95	1.81	6.33	5.89	0.145	0.580	13.80	3.45	43.67	20.33	33.12	8.28	104.82	48.78
7	29.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
7	31.00	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
7	32.50	29	2.96E+07	4.91E-02	4.14E+03	3.23	1.70	1.95	1.81	6.28	5.85	0.142	0.567	14.12	3.53	44.34	20.64	33.88	8.47	106.42	49.54
7	34.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.71	1.94	1.81	6.24	5.81	0.139	0.554	14.43	3.61	44.99	20.95	34.64	8.66	107.98	50.28
7	35.00	30	2.96E+07	4.91E-02	4.28E+03	3.21	1.71	1.94	1.81	6.24	5.81	0.139	0.554	14.43	3.61	44.99	20.95	34.64	8.66	107.98	50.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-64	-
Chainage	6+925	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	138.13	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liqueflable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-64	1.20	20.50	18.00	15.00	200.00	101.74	17.09	4.27
BH-64	1.20	22.00	19.50	16.50	261.48	115.61	17.51	4.38
BH-64	1.20	23.50	21.00	18.00	277.90	129.48	17.51	4.38
BH-64	1.20	25.00	22.50	19.50	294.32	143.35	17.93	4.48
BH-64	1.20	26.50	24.00	21.00	310.73	157.21	17.93	4.48
BH-64	1.20	28.00	25.50	22.50	327.15	171.08	17.93	4.48
BH-64	1.20	29.50	27.00	24.00	343.57	184.95	18.34	4.59
BH-64	1.20	31.00	28.50	25.50	359.99	198.82	18.34	4.59
BH-64	1.20	32.50	30.00	27.00	376.41	212.68	18.34	4.59
BH-64	1.20	34.00	31.50	28.50	392.82	226.55	18.75	4.69
BH-64	1.20	35.00	32.50	29.50	403.77	235.80	18.75	4.69

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	6.11	12.22	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.14	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	18.32	24.43	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	8.14	0.06	25	-	10.00	10.88	1.00	-	6.25	7.00	30.54	36.65	5.65	7.56	50.80	58.36	23.34	13.20
4	7.00	8.50	1.50	Granular	8.14	0.06	25	-	10.00	10.88	1.00	-	7.75	8.50	42.75	48.86	5.65	10.59	65.88	84.03	33.61	18.54
5	8.50	10.00	1.50	Granular	8.14	0.08	28	-	15.70	17.82	1.00	-	9.25	10.00	54.97	61.08	5.65	15.24	132.21	165.61	66.24	25.18
6	10.00	11.50	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	10.75	11.50	68.65	76.22	5.65	19.04	164.91	217.35	86.94	32.89
7	11.50	13.00	1.50	Granular	10.09	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	83.79	91.36	5.65	23.24	195.53	271.20	108.48	41.77
8	13.00	14.50	1.50	Granular	10.39	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	99.15	106.95	5.65	27.50	227.38	330.54	132.22	51.85
9	14.50	16.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	15.25	16.00	114.74	122.54	5.65	32.96	292.40	428.53	171.41	63.45
10	16.00	17.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	16.75	17.50	130.33	138.13	5.65	37.44	328.02	501.59	200.63	76.31
11	17.50	19.00	1.50	Granular	10.39	0.13	27	-	13.80	15.50	1.00	-	18.25	19.00	138.13	138.13	5.65	36.94	252.84	463.34	185.34	89.03
12	19.00	20.50	1.50	Granular	10.09	0.13	27	-	13.80	15.50	1.00	-	19.75	20.50	138.13	138.13	5.65	36.94	252.56	500.00	200.00	101.74
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	138.13	138.13	5.65	41.04	365.21	653.70	261.48	115.61
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	138.13	138.13	5.65	41.04	365.21	694.75	277.90	129.48
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	138.13	138.13	5.65	41.04	365.21	735.79	294.32	143.35
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	138.13	138.13	5.65	41.04	365.21	776.84	310.73	157.21
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	138.13	138.13	5.65	41.04	365.21	817.88	327.15	171.08
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	138.13	138.13	5.65	41.04	365.21	858.93	343.57	184.95
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	138.13	138.13	5.65	41.04	365.21	899.97	359.99	198.82
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	138.13	138.13	5.65	41.04	365.21	941.01	376.41	212.68
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	138.13	138.13	5.65	41.04	365.21	982.06	392.82	226.55
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	138.13	138.13	3.77	27.36	365.21	1009.42	403.77	235.80

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22
2	22.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.45	1.97	1.82	7.45	6.89	0.114	0.457	17.51	4.38	65.28	30.17	42.03	10.51	156.67	72.42
3	23.50	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.45	1.97	1.82	7.45	6.89	0.114	0.457	17.51	4.38	65.28	30.17	42.03	10.51	156.67	72.42
4	25.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
5	26.50	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
6	28.00	28	2.96E+07	1.02E-01	3.99E+03	3.76	1.46	1.97	1.82	7.40	6.84	0.112	0.446	17.93	4.48	66.31	30.66	43.03	10.76	159.15	73.59
7	29.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
7	31.00	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
7	32.50	29	2.96E+07	1.02E-01	4.14E+03	3.74	1.47	1.96	1.82	7.34	6.79	0.109	0.436	18.34	4.59	67.32	31.14	44.02	11.01	161.58	74.74
7	34.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.48	1.96	1.82	7.29	6.74	0.107	0.427	18.75	4.69	68.32	31.61	45.00	11.25	163.96	75.86
7	35.00	30	2.96E+07	1.02E-01	4.28E+03	3.71	1.48	1.96	1.82	7.29	6.74	0.107	0.427	18.75	4.69	68.32	31.61	45.00	11.25	163.96	75.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-65	-
Chainage	6+998	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.17	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-65	1.00	20.50	18.00	16.50	118.39	70.24	10.40	2.60
BH-65	1.00	22.00	19.50	18.00	134.93	78.24	10.73	2.68
BH-65	1.00	23.50	21.00	19.50	144.01	86.24	11.06	2.77
BH-65	1.00	25.00	22.50	21.00	160.88	94.47	11.38	2.85
BH-65	1.00	26.50	24.00	22.50	170.19	102.70	11.70	2.93
BH-65	1.00	28.00	25.50	24.00	187.38	111.16	12.01	3.00
BH-65	1.00	29.50	27.00	25.50	197.10	119.62	12.01	3.00
BH-65	1.00	31.00	28.50	27.00	206.82	128.07	12.32	3.08
BH-65	1.00	32.50	30.00	28.50	216.55	136.53	12.32	3.08
BH-65	1.00	34.00	31.50	30.00	226.27	144.98	12.63	3.16
BH-65	1.00	35.00	32.50	31.00	232.75	150.62	12.63	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.25	10.49	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.99	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.74	20.98	4.71	2.86	13.65	16.50	6.60	6.85
3	5.50	7.00	1.50	Granular	6.99	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	26.23	31.47	4.71	5.20	26.47	34.52	13.81	9.95
4	7.00	8.50	1.50	Granular	9.39	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	38.52	45.56	4.71	7.63	38.09	53.77	21.51	13.74
5	8.50	10.00	1.50	Granular	9.39	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	52.61	59.65	4.71	11.29	66.43	93.40	37.36	18.55
6	10.00	11.50	1.50	Granular	9.39	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	66.70	73.74	4.71	14.31	81.08	122.37	48.95	24.20
7	11.50	13.00	1.50	Granular	8.14	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	79.85	85.96	4.71	17.80	109.47	168.55	67.42	30.84
8	13.00	14.50	1.50	Granular	8.14	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	92.06	98.17	4.71	20.52	124.40	204.00	81.60	38.23
9	14.50	16.00	1.50	Granular	8.14	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	98.17	98.17	4.71	23.50	161.40	264.50	105.80	46.46
10	16.00	17.50	1.50	Granular	8.14	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	98.17	98.17	4.71	23.50	161.40	288.00	115.20	54.69
11	17.50	19.00	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	98.17	98.17	4.71	21.88	125.62	274.10	109.64	62.46
12	19.00	20.50	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	98.17	98.17	4.71	21.88	125.62	295.98	118.39	70.24
13	20.50	22.00	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	98.17	98.17	4.71	22.69	144.29	337.34	134.93	78.24
14	22.00	23.50	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	98.17	98.17	4.71	22.69	144.29	360.02	144.01	86.24
15	23.50	25.00	1.50	Granular	10.39	0.13	29	-	17.60	20.13	1.00	-	24.25	25.00	98.17	98.17	4.71	23.50	162.96	402.19	160.88	94.47
16	25.00	26.50	1.50	Granular	10.09	0.13	29	-	17.60	20.13	1.00	-	25.75	26.50	98.17	98.17	4.71	23.50	162.75	425.48	170.19	102.70
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	98.17	98.17	4.71	24.31	181.40	468.44	187.38	111.16
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	98.17	98.17	4.71	24.31	181.40	492.75	197.10	119.62
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	98.17	98.17	4.71	24.31	181.40	517.06	206.82	128.07
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	98.17	98.17	4.71	24.31	181.40	541.37	216.55	136.53
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	98.17	98.17	4.71	24.31	181.40	565.68	226.27	144.98
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	98.17	98.17	3.14	16.21	181.40	581.89	232.75	150.62

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.15	2.00	1.83	6.96	6.36	0.192	0.769	10.40	2.60	36.16	16.54	24.95	6.24	86.78	39.70
2	22.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.16	2.00	1.83	6.88	6.30	0.186	0.745	10.73	2.68	36.93	16.90	25.76	6.44	88.63	40.57
3	23.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
4	25.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
5	26.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
6	28.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	29.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
7	31.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	32.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	34.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32
7	35.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.22	1.99	1.83	6.52	5.98	0.158	0.633	12.63	3.16	41.16	18.88	30.31	7.58	98.79	45.32

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-65	-
Chainage	6+998	km
Bottom Depth of pile	35.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	122.60	kN/m^2
Pile shaft Length Below cut-off	32.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-65	1.20	20.50	18.00	16.50	180.01	95.32	13.53	3.38
BH-65	1.20	22.00	19.50	18.00	207.02	107.22	13.97	3.49
BH-65	1.20	23.50	21.00	19.50	220.62	119.11	14.39	3.60
BH-65	1.20	25.00	22.50	21.00	248.11	131.35	14.81	3.70
BH-65	1.20	26.50	24.00	22.50	262.06	143.58	15.22	3.81
BH-65	1.20	28.00	25.50	24.00	290.02	156.16	15.63	3.91
BH-65	1.20	29.50	27.00	25.50	304.59	168.74	15.63	3.91
BH-65	1.20	31.00	28.50	27.00	319.17	181.31	16.03	4.01
BH-65	1.20	32.50	30.00	28.50	333.74	193.89	16.03	4.01
BH-65	1.20	34.00	31.50	30.00	348.31	206.46	16.43	4.11
BH-65	1.20	35.00	32.50	31.00	358.03	214.85	16.43	4.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.25	10.49	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.99	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.74	20.98	5.65	3.43	19.97	23.40	9.36	9.67
3	5.50	7.00	1.50	Granular	6.99	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	26.23	31.47	5.65	6.23	38.75	48.41	19.37	13.79
4	7.00	8.50	1.50	Granular	9.39	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	38.52	45.56	5.65	9.16	55.70	74.52	29.81	18.73
5	8.50	10.00	1.50	Granular	9.39	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	52.61	59.65	5.65	13.55	96.93	129.30	51.72	24.90
6	10.00	11.50	1.50	Granular	9.39	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	66.70	73.74	5.65	17.18	118.03	167.57	67.03	32.08
7	11.50	13.00	1.50	Granular	8.14	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	79.85	85.96	5.65	21.35	158.91	229.81	91.92	40.43
8	13.00	14.50	1.50	Granular	8.14	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	92.06	98.17	5.65	24.62	180.41	275.93	110.37	49.70
9	14.50	16.00	1.50	Granular	8.14	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	104.28	110.39	5.65	29.95	261.95	387.42	154.97	60.47
10	16.00	17.50	1.50	Granular	8.14	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	116.49	122.60	5.65	33.46	289.86	448.79	179.52	72.21
11	17.50	19.00	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	18.25	19.00	122.60	122.60	5.65	32.79	225.52	417.24	166.90	83.77
12	19.00	20.50	1.50	Granular	10.39	0.09	27	-	13.80	15.50	1.00	-	19.75	20.50	122.60	122.60	5.65	32.79	225.52	450.03	180.01	95.32
13	20.50	22.00	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	122.60	122.60	5.65	34.00	259.03	517.55	207.02	107.22
14	22.00	23.50	1.50	Granular	10.39	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	122.60	122.60	5.65	34.00	259.03	551.55	220.62	119.11
15	23.50	25.00	1.50	Granular	10.39	0.13	29	-	17.60	20.13	1.00	-	24.25	25.00	122.60	122.60	5.65	35.22	292.55	620.28	248.11	131.35
16	25.00	26.50	1.50	Granular	10.09	0.13	29	-	17.60	20.13	1.00	-	25.75	26.50	122.60	122.60	5.65	35.22	292.19	655.14	262.06	143.58
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	122.60	122.60	5.65	36.43	325.67	725.05	290.02	156.16
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	122.60	122.60	5.65	36.43	325.67	761.48	304.59	168.74
19	29.50	31.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	30.25	31.00	122.60	122.60	5.65	36.43	325.67	797.91	319.17	181.31
20	31.00	32.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	31.75	32.50	122.60	122.60	5.65	36.43	325.67	834.35	333.74	193.89
21	32.50	34.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	33.25	34.00	122.60	122.60	5.65	36.43	325.67	870.78	348.31	206.46
22	34.00	35.00	1.00	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	34.50	35.00	122.60	122.60	3.77	24.29	325.67	895.06	358.03	214.85

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	20.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	0.99	2.02	1.83	8.12	7.39	0.148	0.591	13.53	3.38	54.97	24.99	32.48	8.12	131.92	59.98
2	22.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.00	2.02	1.83	8.04	7.31	0.143	0.573	13.97	3.49	56.14	25.53	33.52	8.38	134.73	61.28
3	23.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
4	25.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
5	26.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
6	28.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	29.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
7	31.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	32.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	34.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43
7	35.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.06	2.01	1.83	7.62	6.94	0.122	0.487	16.43	4.11	62.55	28.51	39.42	9.86	150.12	68.43

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-66	-
Chainage	7+129	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-66	1.00	22.00	19.50	19.50	159.25	82.50	10.45	2.61
BH-66	1.00	23.50	21.00	21.00	169.45	91.29	10.74	2.68
BH-66	1.00	25.00	22.50	22.50	179.65	100.08	11.02	2.76
BH-66	1.00	26.50	24.00	24.00	189.85	108.86	11.02	2.76
BH-66	1.00	28.00	25.50	25.50	200.05	117.65	11.02	2.76
BH-66	1.00	29.50	27.00	27.00	210.25	126.44	11.30	2.83
BH-66	1.00	30.00	27.50	27.50	213.65	129.37	11.30	2.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	5.25	10.49	4.71	1.04	10.29	11.33	4.53	4.69
2	4.00	5.50	1.50	Granular	6.99	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	15.74	20.98	4.71	3.12	18.38	22.54	9.02	7.21
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	4.71	5.63	36.00	45.79	18.32	10.44
4	7.00	8.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	38.52	45.56	4.71	8.27	51.78	69.83	27.93	14.40
5	8.50	10.00	1.50	Granular	9.39	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	52.61	59.65	4.71	11.72	78.01	107.78	43.11	19.33
6	10.00	11.50	1.50	Granular	9.39	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	66.70	73.74	4.71	14.86	95.22	139.86	55.94	25.14
7	11.50	13.00	1.50	Granular	9.39	0.10	26	-	11.90	13.19	1.00	-	12.25	13.00	80.79	87.83	4.71	17.34	95.73	157.71	63.08	31.65
8	13.00	14.50	1.50	Granular	10.09	0.10	26	-	11.90	13.19	1.00	-	13.75	14.50	95.40	102.97	4.71	20.47	111.80	194.25	77.70	39.03
9	14.50	16.00	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	102.97	102.97	4.71	24.65	170.37	277.47	110.99	47.58
10	16.00	17.50	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	102.97	102.97	4.71	24.65	170.37	302.11	120.85	56.13
11	17.50	19.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	102.97	102.97	4.71	25.50	189.89	347.13	138.85	64.92
12	19.00	20.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	102.97	102.97	4.71	25.50	189.89	372.63	149.05	73.71
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	102.97	102.97	4.71	25.50	189.89	398.13	159.25	82.50
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	102.97	102.97	4.71	25.50	189.89	423.63	169.45	91.29
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	102.97	102.97	4.71	25.50	189.89	449.13	179.65	100.08
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	102.97	102.97	4.71	25.50	189.89	474.62	189.85	108.86
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	102.97	102.97	4.71	25.50	189.89	500.12	200.05	117.65
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	102.97	102.97	4.71	25.50	189.89	525.62	210.25	126.44
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	102.97	102.97	1.57	8.50	189.89	534.12	213.65	129.37

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
2	22.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
3	24.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
4	25.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
5	27.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.726	11.02	2.76	37.60	16.91	26.46	6.61	90.23	40.59
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28
7	30.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	0.76	2.05	1.84	6.76	6.09	0.177	0.708	11.30	2.83	38.23	17.20	27.13	6.78	91.76	41.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-66	-
Chainage	7+129	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	133.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-66	1.20	22.00	19.50	19.50	255.35	114.80	13.68	3.42
BH-66	1.20	23.50	21.00	21.00	271.19	128.26	14.06	3.51
BH-66	1.20	25.00	22.50	22.50	287.03	141.72	14.43	3.61
BH-66	1.20	26.50	24.00	24.00	302.87	155.18	14.43	3.61
BH-66	1.20	28.00	25.50	25.50	318.70	168.64	14.43	3.61
BH-66	1.20	29.50	27.00	27.00	334.54	182.11	14.79	3.70
BH-66	1.20	30.00	27.50	27.50	339.82	186.59	14.79	3.70

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	5.25	10.49	5.65	1.25	15.46	16.70	6.68	6.68
2	4.00	5.50	1.50	Granular	6.99	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	15.74	20.98	5.65	3.74	27.10	32.09	12.84	10.10
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	5.65	6.75	52.79	64.53	25.81	14.37
4	7.00	8.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	38.52	45.56	5.65	9.92	75.83	97.49	39.00	19.52
5	8.50	10.00	1.50	Granular	9.39	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	52.61	59.65	5.65	14.07	113.80	149.53	59.81	25.84
6	10.00	11.50	1.50	Granular	9.39	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	66.70	73.74	5.65	17.84	138.59	192.16	76.86	33.21
7	11.50	13.00	1.50	Granular	9.39	0.10	26	-	11.90	13.19	1.00	-	12.25	13.00	80.79	87.83	5.65	20.80	139.13	213.50	85.40	41.41
8	13.00	14.50	1.50	Granular	10.09	0.10	26	-	11.90	13.19	1.00	-	13.75	14.50	95.40	102.97	5.65	24.57	162.36	261.30	104.52	50.66
9	14.50	16.00	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	110.54	118.11	5.65	31.75	281.93	412.63	165.05	61.93
10	16.00	17.50	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	125.68	133.25	5.65	36.10	316.52	483.32	193.33	74.41
11	17.50	19.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	133.25	133.25	5.65	39.60	352.80	559.19	223.67	87.87
12	19.00	20.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	133.25	133.25	5.65	39.60	352.80	598.78	239.51	101.33
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	133.25	133.25	5.65	39.60	352.80	638.38	255.35	114.80
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	133.25	133.25	5.65	39.60	352.80	677.97	271.19	128.26
15	23.50	25.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	133.25	133.25	5.65	39.60	352.80	717.57	287.03	141.72
16	25.00	26.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	133.25	133.25	5.65	39.60	352.80	757.17	302.87	155.18
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	133.25	133.25	5.65	39.60	352.80	796.76	318.70	168.64
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	133.25	133.25	5.65	39.60	352.80	836.36	334.54	182.11
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	133.25	133.25	1.88	13.20	352.80	849.56	339.82	186.59

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
2	22.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
3	24.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
4	25.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
5	27.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.43	3.61	57.36	25.67	34.63	8.66	137.68	61.62
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67
7	30.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	0.65	2.06	1.85	7.89	7.06	0.135	0.541	14.79	3.70	58.33	26.11	35.50	8.88	139.99	62.67

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-67	-
Chainage	7+220	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	96.30	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-67	1.00	22.00	19.50	19.50	148.37	78.19	10.16	2.54
BH-67	1.00	23.50	21.00	21.00	157.91	86.51	10.45	2.61
BH-67	1.00	25.00	22.50	22.50	152.17	94.40	10.45	2.61
BH-67	1.00	26.50	24.00	24.00	161.07	102.28	10.45	2.61
BH-67	1.00	28.00	25.50	25.50	185.25	110.60	10.45	2.61
BH-67	1.00	29.50	27.00	27.00	194.79	118.93	10.74	2.68
BH-67	1.00	30.00	27.50	27.50	197.97	121.70	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	4.71	1.00	8.83	9.83	3.93	4.68
2	4.00	5.50	1.50	Granular	6.99	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	4.71	2.99	16.01	20.00	8.00	7.16
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	4.71	5.63	36.00	45.61	18.25	10.39
4	7.00	8.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	38.52	45.56	4.71	8.27	51.78	69.66	27.86	14.35
5	8.50	10.00	1.50	Granular	9.39	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	52.61	59.65	4.71	10.86	54.86	83.59	33.44	19.04
6	10.00	11.50	1.50	Granular	8.14	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	65.76	71.87	4.71	13.57	64.84	107.14	42.86	24.49
7	11.50	13.00	1.50	Granular	8.14	0.07	26	-	11.90	13.19	1.00	-	12.25	13.00	77.97	84.08	4.71	16.73	91.25	150.28	60.11	30.82
8	13.00	14.50	1.50	Granular	8.14	0.07	26	-	11.90	13.19	1.00	-	13.75	14.50	90.19	96.30	4.71	19.36	103.95	182.34	72.94	37.89
9	14.50	16.00	1.50	Granular	10.09	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	96.30	96.30	4.71	22.26	141.47	242.12	96.85	45.77
10	16.00	17.50	1.50	Granular	10.09	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	96.30	96.30	4.71	22.26	141.47	264.38	105.75	53.65
11	17.50	19.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	96.30	96.30	4.71	23.05	159.78	305.73	122.29	61.76
12	19.00	20.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	96.30	96.30	4.71	23.05	159.78	328.78	131.51	69.86
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	96.30	96.30	4.71	23.85	178.08	370.93	148.37	78.19
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	96.30	96.30	4.71	23.85	178.08	394.78	157.91	86.51
15	23.50	25.00	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	24.25	25.00	96.30	96.30	4.71	22.26	141.47	380.42	152.17	94.40
16	25.00	26.50	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	25.75	26.50	96.30	96.30	4.71	22.26	141.47	402.68	161.07	102.28
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	96.30	96.30	4.71	23.85	178.08	463.13	185.25	110.60
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	96.30	96.30	4.71	23.85	178.08	486.98	194.79	118.93
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	96.30	96.30	1.57	7.95	178.08	494.93	197.97	121.70

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
4	25.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-67	-
Chainage	7+220	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	126.58	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-67	1.20	22.00	19.50	19.50	240.80	109.37	13.30	3.32
BH-67	1.20	23.50	21.00	21.00	255.85	122.28	13.68	3.42
BH-67	1.20	25.00	22.50	22.50	242.27	134.48	13.68	3.42
BH-67	1.20	26.50	24.00	24.00	256.31	146.69	13.68	3.42
BH-67	1.20	28.00	25.50	25.50	298.98	159.59	13.68	3.42
BH-67	1.20	29.50	27.00	27.00	314.02	172.50	14.06	3.51
BH-67	1.20	30.00	27.50	27.50	319.04	176.80	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	5.65	1.19	13.20	14.39	5.76	6.67
2	4.00	5.50	1.50	Granular	6.99	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	5.65	3.58	23.54	28.32	11.33	10.05
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	5.65	6.75	52.79	64.32	25.73	14.31
4	7.00	8.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	38.52	45.56	5.65	9.92	75.83	97.28	38.91	19.47
5	8.50	10.00	1.50	Granular	9.39	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	52.61	59.65	5.65	13.03	80.06	114.54	45.82	25.49
6	10.00	11.50	1.50	Granular	8.14	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	65.76	71.87	5.65	16.28	94.29	145.06	58.02	32.42
7	11.50	13.00	1.50	Granular	8.14	0.07	26	-	11.90	13.19	1.00	-	12.25	13.00	77.97	84.08	5.65	20.08	132.50	203.34	81.34	40.42
8	13.00	14.50	1.50	Granular	8.14	0.07	26	-	11.90	13.19	1.00	-	13.75	14.50	90.19	96.30	5.65	23.23	150.79	244.86	97.94	49.30
9	14.50	16.00	1.50	Granular	10.09	0.00	28	-	15.70	17.82	1.00	-	15.25	16.00	103.87	111.44	5.65	28.81	236.14	359.01	143.60	59.74
10	16.00	17.50	1.50	Granular	10.09	0.00	28	-	15.70	17.82	1.00	-	16.75	17.50	119.01	126.58	5.65	33.01	266.75	422.63	169.05	71.36
11	17.50	19.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	18.25	19.00	126.58	126.58	5.65	36.36	301.27	493.51	197.41	83.91
12	19.00	20.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	19.75	20.50	126.58	126.58	5.65	36.36	301.27	529.87	211.95	96.47
13	20.50	22.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	126.58	126.58	5.65	37.61	335.80	602.01	240.80	109.37
14	22.00	23.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	126.58	126.58	5.65	37.61	335.80	639.62	255.85	122.28
15	23.50	25.00	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	24.25	25.00	126.58	126.58	5.65	35.10	266.75	605.68	242.27	134.48
16	25.00	26.50	1.50	Granular	10.09	0.08	28	-	15.70	17.82	1.00	-	25.75	26.50	126.58	126.58	5.65	35.10	266.75	640.78	256.31	146.69
17	26.50	28.00	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	126.58	126.58	5.65	37.61	335.80	747.44	298.98	159.59
18	28.00	29.50	1.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	126.58	126.58	5.65	37.61	335.80	785.05	314.02	172.50
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	126.58	126.58	1.88	12.54	335.80	797.59	319.04	176.80

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
4	25.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-68	-
Chainage	7+268	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	107.85	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-68	1.00	22.00	19.50	19.50	156.49	83.87	10.45	2.61
BH-68	1.00	23.50	21.00	21.00	166.82	92.74	10.45	2.61
BH-68	1.00	25.00	22.50	22.50	177.23	101.62	10.74	2.68
BH-68	1.00	26.50	24.00	24.00	187.55	110.50	10.74	2.68
BH-68	1.00	28.00	25.50	25.50	197.88	119.38	10.74	2.68
BH-68	1.00	29.50	27.00	27.00	208.21	128.25	10.74	2.68
BH-68	1.00	30.00	27.50	27.50	219.94	131.30	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	6.11	12.22	4.71	1.21	11.99	13.20	5.28	4.74
2	4.00	5.50	1.50	Granular	8.14	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	18.32	24.43	4.71	3.63	21.40	26.24	10.50	7.40
3	5.50	7.00	1.50	Granular	8.14	0.07	27	-	13.80	15.50	1.00	-	6.25	7.00	30.54	36.65	4.71	6.81	49.21	60.86	24.34	10.96
4	7.00	8.50	1.50	Granular	8.14	0.07	27	-	13.80	15.50	1.00	-	7.75	8.50	42.75	48.86	4.71	9.53	64.14	85.31	34.13	15.27
5	8.50	10.00	1.50	Granular	8.14	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	54.97	61.08	4.71	12.70	90.81	124.68	49.87	20.48
6	10.00	11.50	1.50	Granular	10.39	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	68.87	76.67	4.71	15.92	114.09	163.89	65.55	26.59
7	11.50	13.00	1.50	Granular	10.39	0.08	26	-	11.90	13.19	1.00	-	12.25	13.00	84.46	92.26	4.71	18.13	100.80	168.72	67.49	33.31
8	13.00	14.50	1.50	Granular	10.39	0.08	26	-	11.90	13.19	1.00	-	13.75	14.50	100.05	107.85	4.71	21.47	117.01	206.41	82.56	40.97
9	14.50	16.00	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	15.25	16.00	107.85	107.85	4.71	24.03	137.45	250.87	100.35	49.35
10	16.00	17.50	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	16.75	17.50	107.85	107.85	4.71	24.03	137.45	274.91	109.96	57.73
11	17.50	19.00	1.50	Granular	10.09	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	107.85	107.85	4.71	24.93	157.69	320.08	128.03	66.36
12	19.00	20.50	1.50	Granular	10.09	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	107.85	107.85	4.71	24.93	157.69	345.01	138.00	74.99
13	20.50	22.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	107.85	107.85	4.71	25.82	178.10	391.23	156.49	83.87
14	22.00	23.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	107.85	107.85	4.71	25.82	178.10	417.05	166.82	92.74
15	23.50	25.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	24.25	25.00	107.85	107.85	4.71	25.82	178.31	443.07	177.23	101.62
16	25.00	26.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	25.75	26.50	107.85	107.85	4.71	25.82	178.31	468.88	187.55	110.50
17	26.50	28.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	27.25	28.00	107.85	107.85	4.71	25.82	178.31	494.70	197.88	119.38
18	28.00	29.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	28.75	29.50	107.85	107.85	4.71	25.82	178.31	520.52	208.21	128.25
19	29.50	30.00	0.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	107.85	107.85	1.57	8.90	198.74	549.85	219.94	131.30

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
4	25.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-68	-
Chainage	7+268	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	139.03	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-68	1.20	22.00	19.50	19.50	248.02	116.13	13.68	3.42
BH-68	1.20	23.50	21.00	21.00	264.00	129.69	13.68	3.42
BH-68	1.20	25.00	22.50	22.50	280.12	143.24	14.06	3.51
BH-68	1.20	26.50	24.00	24.00	296.09	156.80	14.06	3.51
BH-68	1.20	28.00	25.50	25.50	312.06	170.36	14.06	3.51
BH-68	1.20	29.50	27.00	27.00	328.04	183.91	14.06	3.51
BH-68	1.20	30.00	27.50	27.50	348.68	188.56	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.14	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	6.11	12.22	5.65	1.45	18.00	19.45	7.78	6.74
2	4.00	5.50	1.50	Granular	8.14	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	18.32	24.43	5.65	4.36	31.56	37.37	14.95	10.33
3	5.50	7.00	1.50	Granular	8.14	0.07	27	-	13.80	15.50	1.00	-	6.25	7.00	30.54	36.65	5.65	8.17	72.14	86.11	34.45	15.00
4	7.00	8.50	1.50	Granular	8.14	0.07	27	-	13.80	15.50	1.00	-	7.75	8.50	42.75	48.86	5.65	11.43	93.64	119.04	47.62	20.57
5	8.50	10.00	1.50	Granular	8.14	0.03	28	-	15.70	17.82	1.00	-	9.25	10.00	54.97	61.08	5.65	15.24	132.21	172.87	69.15	27.22
6	10.00	11.50	1.50	Granular	10.39	0.03	28	-	15.70	17.82	1.00	-	10.75	11.50	68.87	76.67	5.65	19.10	166.14	225.90	90.36	34.94
7	11.50	13.00	1.50	Granular	10.39	0.08	26	-	11.90	13.19	1.00	-	12.25	13.00	84.46	92.26	5.65	21.75	146.56	228.07	91.23	43.41
8	13.00	14.50	1.50	Granular	10.39	0.08	26	-	11.90	13.19	1.00	-	13.75	14.50	100.05	107.85	5.65	25.77	169.91	277.18	110.87	52.99
9	14.50	16.00	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	15.25	16.00	115.64	123.44	5.65	30.93	226.99	365.18	146.07	64.03
10	16.00	17.50	1.50	Granular	10.39	0.05	27	-	13.80	15.50	1.00	-	16.75	17.50	131.23	139.03	5.65	35.10	254.42	427.71	171.09	76.23
11	17.50	19.00	1.50	Granular	10.09	0.10	28	-	15.70	17.82	1.00	-	18.25	19.00	139.03	139.03	5.65	38.56	291.93	503.78	201.51	89.40
12	19.00	20.50	1.50	Granular	10.09	0.10	28	-	15.70	17.82	1.00	-	19.75	20.50	139.03	139.03	5.65	38.56	291.93	542.34	216.94	102.57
13	20.50	22.00	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	21.25	22.00	139.03	139.03	5.65	39.93	329.72	620.06	248.02	116.13
14	22.00	23.50	1.50	Granular	10.09	0.09	29	-	17.60	20.13	1.00	-	22.75	23.50	139.03	139.03	5.65	39.93	329.72	660.00	264.00	129.69
15	23.50	25.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	24.25	25.00	139.03	139.03	5.65	39.93	330.08	700.29	280.12	143.24
16	25.00	26.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	25.75	26.50	139.03	139.03	5.65	39.93	330.08	740.23	296.09	156.80
17	26.50	28.00	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	27.25	28.00	139.03	139.03	5.65	39.93	330.08	780.16	312.06	170.36
18	28.00	29.50	1.50	Granular	10.39	0.09	29	-	17.60	20.13	1.00	-	28.75	29.50	139.03	139.03	5.65	39.93	330.08	820.10	328.04	183.91
19	29.50	30.00	0.50	Granular	10.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	139.03	139.03	1.88	13.77	367.91	871.69	348.68	188.56

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
4	25.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69	-
Chainage	7+329	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	100.42	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69	1.00	22.00	19.50	19.50	137.83	79.44	10.16	2.54
BH-69	1.00	23.50	21.00	21.00	147.12	87.59	10.16	2.54
BH-69	1.00	25.00	22.50	22.50	148.45	95.50	10.16	2.54
BH-69	1.00	26.50	24.00	24.00	157.40	103.42	10.16	2.54
BH-69	1.00	28.00	25.50	25.50	182.26	111.80	10.45	2.61
BH-69	1.00	29.50	27.00	27.00	191.88	120.18	10.45	2.61
BH-69	1.00	30.00	27.50	27.50	202.81	123.05	10.45	2.61

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	4.71	1.00	8.83	9.83	3.93	4.68
2	4.00	5.50	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	4.71	2.99	16.01	20.00	8.00	7.16
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	4.71	5.63	36.00	45.61	18.25	10.39
4	7.00	8.50	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	36.72	41.96	4.71	7.88	46.91	64.40	25.76	14.24
5	8.50	10.00	1.50	Granular	9.39	0.07	24	-	8.00	9.78	1.00	-	9.25	10.00	49.01	56.05	4.71	9.71	46.18	73.38	29.35	18.61
6	10.00	11.50	1.50	Granular	9.39	0.07	24	-	8.00	9.78	1.00	-	10.75	11.50	63.10	70.14	4.71	12.50	57.04	96.74	38.70	23.76
7	11.50	13.00	1.50	Granular	10.09	0.06	26	-	11.90	13.19	1.00	-	12.25	13.00	77.71	85.28	4.71	16.68	93.41	149.79	59.91	30.08
8	13.00	14.50	1.50	Granular	10.09	0.06	26	-	11.90	13.19	1.00	-	13.75	14.50	92.85	100.42	4.71	19.93	109.15	185.46	74.18	37.31
9	14.50	16.00	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	100.42	100.42	4.71	24.04	166.32	266.66	106.66	45.69
10	16.00	17.50	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	100.42	100.42	4.71	24.04	166.32	290.70	116.28	54.07
11	17.50	19.00	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	18.25	19.00	100.42	100.42	4.71	24.87	185.38	334.62	133.85	62.68
12	19.00	20.50	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	19.75	20.50	100.42	100.42	4.71	24.87	185.38	359.49	143.80	71.29
13	20.50	22.00	1.50	Granular	10.09	0.09	28	-	15.70	17.82	1.00	-	21.25	22.00	100.42	100.42	4.71	23.21	147.27	344.59	137.83	79.44
14	22.00	23.50	1.50	Granular	10.09	0.09	28	-	15.70	17.82	1.00	-	22.75	23.50	100.42	100.42	4.71	23.21	147.27	367.80	147.12	87.59
15	23.50	25.00	1.50	Granular	10.09	0.08	27	-	13.80	15.50	1.00	-	24.25	25.00	100.42	100.42	4.71	22.38	128.21	371.12	148.45	95.50
16	25.00	26.50	1.50	Granular	10.09	0.08	27	-	13.80	15.50	1.00	-	25.75	26.50	100.42	100.42	4.71	22.38	128.21	393.50	157.40	103.42
17	26.50	28.00	1.50	Granular	10.09	0.10	29	-	17.60	20.13	1.00	-	27.25	28.00	100.42	100.42	4.71	24.04	166.32	455.65	182.26	111.80
18	28.00	29.50	1.50	Granular	10.09	0.10	29	-	17.60	20.13	1.00	-	28.75	29.50	100.42	100.42	4.71	24.04	166.32	479.69	191.88	120.18
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	100.42	100.42	1.57	8.29	185.38	507.03	202.81	123.05

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
3	24.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.788	10.16	2.54	35.60	16.00	24.38	6.09	85.45	38.40
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
6	28.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.28	16.31	25.08	6.27	87.08	39.15

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69	-
Chainage	7+329	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	130.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69	1.20	22.00	19.50	19.50	218.79	110.96	13.30	3.32
BH-69	1.20	23.50	21.00	21.00	233.29	123.48	13.30	3.32
BH-69	1.20	25.00	22.50	22.50	233.03	135.65	13.30	3.32
BH-69	1.20	26.50	24.00	24.00	247.01	147.81	13.30	3.32
BH-69	1.20	28.00	25.50	25.50	290.51	160.70	13.68	3.42
BH-69	1.20	29.50	27.00	27.00	305.53	173.58	13.68	3.42
BH-69	1.20	30.00	27.50	27.50	324.95	178.00	13.68	3.42

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	5.65	1.19	13.20	14.39	5.76	6.67
2	4.00	5.50	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	5.65	3.58	23.54	28.32	11.33	10.05
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	5.65	6.75	52.79	64.32	25.73	14.31
4	7.00	8.50	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	36.72	41.96	5.65	9.46	68.50	89.49	35.79	19.34
5	8.50	10.00	1.50	Granular	9.39	0.07	24	-	8.00	9.78	1.00	-	9.25	10.00	49.01	56.05	5.65	11.65	67.35	99.99	40.00	24.97
6	10.00	11.50	1.50	Granular	9.39	0.07	24	-	8.00	9.78	1.00	-	10.75	11.50	63.10	70.14	5.65	15.00	82.99	130.63	52.25	31.55
7	11.50	13.00	1.50	Granular	10.09	0.06	26	-	11.90	13.19	1.00	-	12.25	13.00	77.71	85.28	5.65	20.01	135.87	203.52	81.41	39.53
8	13.00	14.50	1.50	Granular	10.09	0.06	26	-	11.90	13.19	1.00	-	13.75	14.50	92.85	100.42	5.65	23.91	158.54	250.11	100.04	48.60
9	14.50	16.00	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	107.99	115.56	5.65	31.02	276.11	398.69	159.48	59.66
10	16.00	17.50	1.50	Granular	10.09	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	123.13	130.70	5.65	35.37	310.70	468.65	187.46	71.94
11	17.50	19.00	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	18.25	19.00	130.70	130.70	5.65	38.84	346.30	543.09	217.24	85.19
12	19.00	20.50	1.50	Granular	10.09	0.10	30	-	19.50	22.44	1.00	-	19.75	20.50	130.70	130.70	5.65	38.84	346.30	581.93	232.77	98.43
13	20.50	22.00	1.50	Granular	10.09	0.09	28	-	15.70	17.82	1.00	-	21.25	22.00	130.70	130.70	5.65	36.25	275.09	546.97	218.79	110.96
14	22.00	23.50	1.50	Granular	10.09	0.09	28	-	15.70	17.82	1.00	-	22.75	23.50	130.70	130.70	5.65	36.25	275.09	583.22	233.29	123.48
15	23.50	25.00	1.50	Granular	10.09	0.08	27	-	13.80	15.50	1.00	-	24.25	25.00	130.70	130.70	5.65	34.95	239.49	582.57	233.03	135.65
16	25.00	26.50	1.50	Granular	10.09	0.08	27	-	13.80	15.50	1.00	-	25.75	26.50	130.70	130.70	5.65	34.95	239.49	617.52	247.01	147.81
17	26.50	28.00	1.50	Granular	10.09	0.10	29	-	17.60	20.13	1.00	-	27.25	28.00	130.70	130.70	5.65	37.54	310.70	726.28	290.51	160.70
18	28.00	29.50	1.50	Granular	10.09	0.10	29	-	17.60	20.13	1.00	-	28.75	29.50	130.70	130.70	5.65	37.54	310.70	763.82	305.53	173.58
19	29.50	30.00	0.50	Granular	10.09	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	130.70	130.70	1.88	12.95	346.30	812.37	324.95	178.00

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
3	24.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	0.63	2.07	1.85	8.17	7.31	0.150	0.602	13.30	3.32	54.33	24.30	31.92	7.98	130.40	58.32
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
6	28.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.44

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69A	-
Chainage	7+392	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	99.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69A	1.00	22.00	19.50	19.50	155.07	81.72	10.74	2.68
BH-69A	1.00	23.50	21.00	21.00	165.41	90.28	10.74	2.68
BH-69A	1.00	25.00	22.50	22.50	167.40	98.60	10.74	2.68
BH-69A	1.00	26.50	24.00	24.00	176.94	106.93	10.74	2.68
BH-69A	1.00	28.00	25.50	25.50	186.48	115.25	10.74	2.68
BH-69A	1.00	29.50	27.00	27.00	196.01	123.58	10.74	2.68
BH-69A	1.00	30.00	27.50	27.50	199.19	126.35	10.74	2.68

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	4.71	1.00	8.83	9.83	3.93	4.68
2	4.00	5.50	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	4.71	2.99	16.01	20.00	8.00	7.16
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	4.71	5.63	36.00	45.61	18.25	10.39
4	7.00	8.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	38.52	45.56	4.71	8.27	51.78	69.66	27.86	14.35
5	8.50	10.00	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	52.61	59.65	4.71	11.29	66.43	95.60	38.24	19.16
6	10.00	11.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	66.70	73.74	4.71	14.31	81.08	124.56	49.83	24.82
7	11.50	13.00	1.50	Granular	9.39	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	80.79	87.83	4.71	18.67	129.15	191.30	76.52	31.70
8	13.00	14.50	1.50	Granular	7.84	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	93.71	99.60	4.71	21.66	144.71	228.53	91.41	39.41
9	14.50	16.00	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	99.60	99.60	4.71	23.84	163.45	271.10	108.44	47.74
10	16.00	17.50	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	99.60	99.60	4.71	23.84	163.45	294.94	117.98	56.06
11	17.50	19.00	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	99.60	99.60	4.71	24.66	182.19	338.34	135.34	64.61
12	19.00	20.50	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	99.60	99.60	4.71	24.66	182.19	363.01	145.20	73.17
13	20.50	22.00	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	99.60	99.60	4.71	24.66	182.19	387.67	155.07	81.72
14	22.00	23.50	1.50	Granular	9.39	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	99.60	99.60	4.71	24.66	183.38	413.52	165.41	90.28
15	23.50	25.00	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	24.25	25.00	99.60	99.60	4.71	23.84	164.53	418.51	167.40	98.60
16	25.00	26.50	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	25.75	26.50	99.60	99.60	4.71	23.84	164.53	442.35	176.94	106.93
17	26.50	28.00	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	27.25	28.00	99.60	99.60	4.71	23.84	164.53	466.19	186.48	115.25
18	28.00	29.50	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	28.75	29.50	99.60	99.60	4.71	23.84	164.53	490.03	196.01	123.58
19	29.50	30.00	0.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	29.75	30.00	99.60	99.60	1.57	7.95	164.53	497.98	199.19	126.35

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
2	22.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
4	25.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
5	27.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	0.75	2.05	1.84	6.88	6.19	0.186	0.745	10.74	2.68	36.95	16.62	25.77	6.44	88.68	39.88

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69A	-
Chainage	7+392	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	123.13	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69A	1.20	22.00	19.50	19.50	239.33	111.64	14.06	3.51
BH-69A	1.20	23.50	21.00	21.00	254.79	124.26	14.06	3.51
BH-69A	1.20	25.00	22.50	22.50	255.53	136.54	14.06	3.51
BH-69A	1.20	26.50	24.00	24.00	269.67	148.82	14.06	3.51
BH-69A	1.20	28.00	25.50	25.50	283.82	161.09	14.06	3.51
BH-69A	1.20	29.50	27.00	27.00	297.97	173.37	14.06	3.51
BH-69A	1.20	30.00	27.50	27.50	302.68	177.46	14.06	3.51

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	5.65	1.19	13.20	14.39	5.76	6.67
2	4.00	5.50	1.50	Granular	6.99	0.04	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	5.65	3.58	23.54	28.32	11.33	10.05
3	5.50	7.00	1.50	Granular	6.99	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	26.23	31.47	5.65	6.75	52.79	64.32	25.73	14.31
4	7.00	8.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	38.52	45.56	5.65	9.92	75.83	97.28	38.91	19.47
5	8.50	10.00	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	52.61	59.65	5.65	13.55	96.93	131.93	52.77	25.63
6	10.00	11.50	1.50	Granular	9.39	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	66.70	73.74	5.65	17.18	118.03	170.20	68.08	32.82
7	11.50	13.00	1.50	Granular	9.39	0.07	28	-	15.70	17.82	1.00	-	12.25	13.00	80.79	87.83	5.65	22.41	187.65	262.23	104.89	41.47
8	13.00	14.50	1.50	Granular	7.84	0.07	28	-	15.70	17.82	1.00	-	13.75	14.50	93.71	99.60	5.65	25.99	209.79	310.36	124.14	51.12
9	14.50	16.00	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	15.25	16.00	105.48	111.36	5.65	30.30	263.82	394.69	157.87	61.98
10	16.00	17.50	1.50	Granular	7.84	0.08	29	-	17.60	20.13	1.00	-	16.75	17.50	117.24	123.13	5.65	33.68	290.70	455.24	182.10	73.78
11	17.50	19.00	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	123.13	123.13	5.65	36.59	324.02	525.16	210.06	86.40
12	19.00	20.50	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	123.13	123.13	5.65	36.59	324.02	561.74	224.70	99.02
13	20.50	22.00	1.50	Granular	7.84	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	123.13	123.13	5.65	36.59	324.02	598.33	239.33	111.64
14	22.00	23.50	1.50	Granular	9.39	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	123.13	123.13	5.65	36.59	326.08	636.98	254.79	124.26
15	23.50	25.00	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	24.25	25.00	123.13	123.13	5.65	35.37	292.55	638.82	255.53	136.54
16	25.00	26.50	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	25.75	26.50	123.13	123.13	5.65	35.37	292.55	674.19	269.67	148.82
17	26.50	28.00	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	27.25	28.00	123.13	123.13	5.65	35.37	292.55	709.55	283.82	161.09
18	28.00	29.50	1.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	28.75	29.50	123.13	123.13	5.65	35.37	292.55	744.92	297.97	173.37
19	29.50	30.00	0.50	Granular	9.39	0.04	29	-	17.60	20.13	1.00	-	29.75	30.00	123.13	123.13	1.88	11.79	292.55	756.71	302.68	177.46

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_f/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
2	22.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
4	25.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
5	27.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	0.64	2.07	1.85	8.02	7.18	0.142	0.569	14.06	3.51	56.38	25.23	33.74	8.43	135.31	60.54

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69B	-
Chainage	7+369	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	103.82	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69B	1.00	22.00	19.50	13.50	133.55	75.49	11.65	2.91
BH-69B	1.00	23.50	21.00	15.00	143.53	83.86	12.04	3.01
BH-69B	1.00	25.00	22.50	16.50	153.13	92.23	12.42	3.11
BH-69B	1.00	26.50	24.00	18.00	170.92	100.84	12.80	3.20
BH-69B	1.00	28.00	25.50	19.50	180.86	109.44	13.16	3.29
BH-69B	1.00	29.50	27.00	21.00	190.80	118.05	13.53	3.38
BH-69B	1.00	30.00	27.50	21.50	202.07	121.00	13.53	3.38

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.25	10.49	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.80	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	23.09	35.69	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	0.00	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	35.69	35.69	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	9.39	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	42.74	49.78	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	9.25	10.00	56.83	63.87	4.71	11.26	52.21	63.47	25.39	14.15
6	10.00	11.50	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	10.75	11.50	70.92	77.96	4.71	14.05	63.07	88.38	35.35	19.73
7	11.50	13.00	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	12.25	13.00	85.01	92.05	4.71	16.84	73.94	116.08	46.43	26.09
8	13.00	14.50	1.50	Granular	7.84	0.06	24	-	8.00	9.78	1.00	-	13.75	14.50	97.93	103.82	4.71	19.40	82.52	144.06	57.63	33.18
9	14.50	16.00	1.50	Granular	7.84	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	103.82	103.82	4.71	24.85	170.15	256.54	102.62	41.78
10	16.00	17.50	1.50	Granular	7.84	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	103.82	103.82	4.71	24.85	170.15	281.39	112.56	50.39
11	17.50	19.00	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	18.25	19.00	103.82	103.82	4.71	23.99	150.64	285.88	114.35	58.76
12	19.00	20.50	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	103.82	103.82	4.71	23.99	150.64	309.88	123.95	67.13
13	20.50	22.00	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	103.82	103.82	4.71	23.99	150.64	333.87	133.55	75.49
14	22.00	23.50	1.50	Granular	9.39	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	103.82	103.82	4.71	23.99	151.60	358.82	143.53	83.86
15	23.50	25.00	1.50	Granular	9.39	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	103.82	103.82	4.71	23.99	151.60	382.82	153.13	92.23
16	25.00	26.50	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	25.75	26.50	103.82	103.82	4.71	24.85	171.22	427.29	170.92	100.84
17	26.50	28.00	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	27.25	28.00	103.82	103.82	4.71	24.85	171.22	452.14	180.86	109.44
18	28.00	29.50	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	28.75	29.50	103.82	103.82	4.71	24.85	171.22	476.99	190.80	118.05
19	29.50	30.00	0.50	Granular	9.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	103.82	103.82	1.57	8.57	190.84	505.18	202.07	121.00

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	2.42	1.90	1.80	6.70	6.32	0.172	0.687	11.65	2.91	39.01	18.41	27.96	6.99	93.62	44.17
2	22.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	2.44	1.90	1.80	6.62	6.25	0.166	0.664	12.04	3.01	39.87	18.82	28.90	7.22	95.70	45.17
3	24.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.47	1.90	1.80	6.56	6.19	0.161	0.644	12.42	3.11	40.71	19.22	29.81	7.45	97.71	46.13
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	2.49	1.90	1.80	6.49	6.13	0.156	0.625	12.80	3.20	41.53	19.61	30.71	7.68	99.66	47.06
5	27.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	2.51	1.90	1.79	6.43	6.07	0.152	0.608	13.16	3.29	42.32	19.99	31.59	7.90	101.56	47.97
6	28.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	2.53	1.90	1.79	6.37	6.02	0.148	0.591	13.53	3.38	43.09	20.36	32.46	8.12	103.41	48.86
7	30.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	2.53	1.90	1.79	6.37	6.02	0.148	0.591	13.53	3.38	43.09	20.36	32.46	8.12	103.41	48.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-69B	-
Chainage	7+369	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	123.13	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-69B	1.20	22.00	19.50	13.50	197.45	100.99	15.21	3.80
BH-69B	1.20	23.50	21.00	15.00	211.78	112.92	15.73	3.93
BH-69B	1.20	25.00	22.50	16.50	225.43	124.86	16.23	4.06
BH-69B	1.20	26.50	24.00	18.00	252.99	137.14	16.72	4.18
BH-69B	1.20	28.00	25.50	19.50	267.14	149.42	17.21	4.30
BH-69B	1.20	29.50	27.00	21.00	281.29	161.69	17.68	4.42
BH-69B	1.20	30.00	27.50	21.50	299.57	165.90	17.68	4.42

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.04	25	-	10.00	10.88	1.00	-	3.25	4.00	5.25	10.49	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.99	0.04	25	-	10.00	10.88	1.00	-	4.75	5.50	15.74	20.98	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	6.99	0.04	25	-	10.00	10.88	1.00	-	6.25	7.00	26.23	31.47	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	9.39	0.04	25	-	10.00	10.88	1.00	-	7.75	8.50	38.52	45.56	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	9.25	10.00	52.61	59.65	5.65	12.51	71.35	83.85	33.54	19.34
6	10.00	11.50	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	10.75	11.50	66.70	73.74	5.65	15.85	86.99	115.35	46.14	26.15
7	11.50	13.00	1.50	Granular	9.39	0.06	24	-	8.00	9.78	1.00	-	12.25	13.00	80.79	87.83	5.65	19.20	102.64	150.20	60.08	33.90
8	13.00	14.50	1.50	Granular	7.84	0.06	24	-	8.00	9.78	1.00	-	13.75	14.50	93.71	99.60	5.65	22.28	114.85	184.70	73.88	42.51
9	14.50	16.00	1.50	Granular	7.84	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	105.48	111.36	5.65	30.30	263.82	363.96	145.58	53.37
10	16.00	17.50	1.50	Granular	7.84	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	117.24	123.13	5.65	33.68	290.70	424.51	169.81	65.18
11	17.50	19.00	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	18.25	19.00	123.13	123.13	5.65	34.15	257.37	425.34	170.13	77.11
12	19.00	20.50	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	123.13	123.13	5.65	34.15	257.37	459.48	183.79	89.05
13	20.50	22.00	1.50	Granular	7.84	0.11	28	-	15.70	17.82	1.00	-	21.25	22.00	123.13	123.13	5.65	34.15	257.37	493.63	197.45	100.99
14	22.00	23.50	1.50	Granular	9.39	0.11	28	-	15.70	17.82	1.00	-	22.75	23.50	123.13	123.13	5.65	34.15	259.03	529.44	211.78	112.92
15	23.50	25.00	1.50	Granular	9.39	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	123.13	123.13	5.65	34.15	259.03	563.59	225.43	124.86
16	25.00	26.50	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	25.75	26.50	123.13	123.13	5.65	35.37	292.55	632.48	252.99	137.14
17	26.50	28.00	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	27.25	28.00	123.13	123.13	5.65	35.37	292.55	667.85	267.14	149.42
18	28.00	29.50	1.50	Granular	9.39	0.12	29	-	17.60	20.13	1.00	-	28.75	29.50	123.13	123.13	5.65	35.37	292.55	703.21	281.29	161.69
19	29.50	30.00	0.50	Granular	9.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	123.13	123.13	1.88	12.20	326.08	748.94	299.57	165.90

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	2.09	1.92	1.80	7.81	7.34	0.131	0.526	15.21	3.80	59.43	27.90	36.51	9.13	142.63	66.95
2	22.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	2.11	1.92	1.80	7.73	7.26	0.127	0.509	15.73	3.93	60.76	28.53	37.74	9.44	145.81	68.48
3	24.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	2.13	1.92	1.80	7.65	7.18	0.123	0.493	16.23	4.06	62.04	29.15	38.95	9.74	148.90	69.95
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	2.15	1.92	1.80	7.57	7.12	0.120	0.478	16.72	4.18	63.30	29.75	40.13	10.03	151.91	71.39
5	27.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	2.17	1.92	1.80	7.50	7.05	0.116	0.465	17.21	4.30	64.51	30.33	41.30	10.32	154.83	72.79
6	28.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	2.19	1.91	1.80	7.43	6.99	0.113	0.452	17.68	4.42	65.70	30.90	42.44	10.61	157.68	74.15
7	30.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	2.19	1.91	1.80	7.43	6.99	0.113	0.452	17.68	4.42	65.70	30.90	42.44	10.61	157.68	74.15

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-70	-
Chainage	7+487	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	99.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-70	1.00	22.00	19.50	15.00	132.42	76.10	11.26	2.82
BH-70	1.00	23.50	21.00	16.50	141.63	84.19	12.01	3.00
BH-70	1.00	25.00	22.50	18.00	150.84	92.29	12.01	3.00
BH-70	1.00	26.50	24.00	19.50	167.92	100.61	12.01	3.00
BH-70	1.00	28.00	25.50	21.00	177.45	108.94	12.38	3.10
BH-70	1.00	29.50	27.00	22.50	186.99	117.26	12.74	3.19
BH-70	1.00	30.00	27.50	23.00	197.82	120.11	12.74	3.19

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Presure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.06	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.99	0.06	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	6.99	0.06	23	-	6.00	8.68	1.00	-	6.25	7.00	26.23	31.47	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	7.75	8.50	38.52	45.56	4.71	7.31	33.41	40.72	16.29	11.39
5	8.50	10.00	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	9.25	10.00	52.61	59.65	4.71	9.99	43.05	60.35	24.14	15.84
6	10.00	11.50	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	10.75	11.50	66.70	73.74	4.71	12.66	52.70	82.66	33.06	21.03
7	11.50	13.00	1.50	Granular	9.39	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	80.79	87.83	4.71	18.67	129.15	177.78	71.11	27.91
8	13.00	14.50	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	93.71	99.60	4.71	21.66	144.71	215.01	86.00	35.63
9	14.50	16.00	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	15.25	16.00	99.60	99.60	4.71	23.02	144.71	238.02	95.21	43.72
10	16.00	17.50	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	16.75	17.50	99.60	99.60	4.71	23.02	144.71	261.04	104.42	51.81
11	17.50	19.00	1.50	Granular	7.84	0.05	28	-	15.70	17.82	1.00	-	18.25	19.00	99.60	99.60	4.71	23.02	144.71	284.06	113.62	59.91
12	19.00	20.50	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	19.75	20.50	99.60	99.60	4.71	23.02	145.67	308.04	123.22	68.00
13	20.50	22.00	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	21.25	22.00	99.60	99.60	4.71	23.02	145.67	331.06	132.42	76.10
14	22.00	23.50	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	22.75	23.50	99.60	99.60	4.71	23.02	145.67	354.08	141.63	84.19
15	23.50	25.00	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	24.25	25.00	99.60	99.60	4.71	23.02	145.67	377.09	150.84	92.29
16	25.00	26.50	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	25.75	26.50	99.60	99.60	4.71	23.84	164.53	419.79	167.92	100.61
17	26.50	28.00	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	27.25	28.00	99.60	99.60	4.71	23.84	164.53	443.63	177.45	108.94
18	28.00	29.50	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	28.75	29.50	99.60	99.60	4.71	23.84	164.53	467.47	186.99	117.26
19	29.50	30.00	0.50	Granular	9.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	99.60	99.60	1.57	8.22	183.38	494.54	197.82	120.11

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_f/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.99	1.93	1.80	6.77	6.35	0.178	0.710	11.26	2.82	38.14	17.87	27.03	6.76	91.53	42.89
2	22.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.166	0.666	12.01	3.00	39.82	18.67	28.84	7.21	95.56	44.81
3	24.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.166	0.666	12.01	3.00	39.82	18.67	28.84	7.21	95.56	44.81
4	25.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	2.03	1.92	1.80	6.63	6.22	0.166	0.666	12.01	3.00	39.82	18.67	28.84	7.21	95.56	44.81
5	27.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	2.05	1.92	1.80	6.56	6.16	0.162	0.646	12.38	3.10	40.62	19.06	29.71	7.43	97.50	45.74
6	28.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	2.07	1.92	1.80	6.50	6.10	0.157	0.628	12.74	3.19	41.41	19.43	30.58	7.64	99.38	46.64
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	2.07	1.92	1.80	6.50	6.10	0.157	0.628	12.74	3.19	41.41	19.43	30.58	7.64	99.38	46.64

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-70	-
Chainage	7+487	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	123.13	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-70	1.20	22.00	19.50	15.00	203.04	104.43	14.65	3.66
BH-70	1.20	23.50	21.00	16.50	216.70	116.37	15.63	3.91
BH-70	1.20	25.00	22.50	18.00	230.35	128.30	15.63	3.91
BH-70	1.20	26.50	24.00	19.50	257.91	140.58	15.63	3.91
BH-70	1.20	28.00	25.50	21.00	272.06	152.86	16.11	4.03
BH-70	1.20	29.50	27.00	22.50	286.21	165.14	16.58	4.15
BH-70	1.20	30.00	27.50	23.00	304.49	169.35	16.58	4.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Coeff. of Earth Pressure (K_s)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.99	0.06	23	-	6.00	8.68	1.00	-	3.25	4.00	5.25	10.49	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.99	0.06	23	-	6.00	8.68	1.00	-	4.75	5.50	15.74	20.98	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	6.99	0.06	23	-	6.00	8.68	1.00	-	6.25	7.00	26.23	31.47	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	7.75	8.50	38.52	45.56	5.65	8.77	48.75	57.52	23.01	15.92
5	8.50	10.00	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	9.25	10.00	52.61	59.65	5.65	11.98	62.63	83.39	33.36	21.65
6	10.00	11.50	1.50	Granular	9.39	0.06	23	-	6.00	8.68	1.00	-	10.75	11.50	66.70	73.74	5.65	15.19	76.52	112.48	44.99	28.28
7	11.50	13.00	1.50	Granular	9.39	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	80.79	87.83	5.65	22.41	187.65	246.01	98.40	36.92
8	13.00	14.50	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	93.71	99.60	5.65	25.99	209.79	294.14	117.65	46.58
9	14.50	16.00	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	15.25	16.00	105.48	111.36	5.65	29.25	233.58	347.18	138.87	57.14
10	16.00	17.50	1.50	Granular	7.84	0.08	28	-	15.70	17.82	1.00	-	16.75	17.50	117.24	123.13	5.65	32.52	257.37	403.49	161.40	68.62
11	17.50	19.00	1.50	Granular	7.84	0.05	28	-	15.70	17.82	1.00	-	18.25	19.00	123.13	123.13	5.65	34.15	257.37	437.64	175.05	80.56
12	19.00	20.50	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	19.75	20.50	123.13	123.13	5.65	34.15	259.03	473.44	189.38	92.50
13	20.50	22.00	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	21.25	22.00	123.13	123.13	5.65	34.15	259.03	507.59	203.04	104.43
14	22.00	23.50	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	22.75	23.50	123.13	123.13	5.65	34.15	259.03	541.74	216.70	116.37
15	23.50	25.00	1.50	Granular	9.39	0.05	28	-	15.70	17.82	1.00	-	24.25	25.00	123.13	123.13	5.65	34.15	259.03	575.89	230.35	128.30
16	25.00	26.50	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	25.75	26.50	123.13	123.13	5.65	35.37	292.55	644.78	257.91	140.58
17	26.50	28.00	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	27.25	28.00	123.13	123.13	5.65	35.37	292.55	680.15	272.06	152.86
18	28.00	29.50	1.50	Granular	9.39	0.10	29	-	17.60	20.13	1.00	-	28.75	29.50	123.13	123.13	5.65	35.37	292.55	715.52	286.21	165.14
19	29.50	30.00	0.50	Granular	9.39	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	123.13	123.13	1.88	12.20	326.08	761.24	304.49	169.35

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.72	1.94	1.81	7.91	7.37	0.137	0.546	14.65	3.66	57.95	26.99	35.16	8.79	139.08	64.77
2	22.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.76	1.94	1.81	7.74	7.22	0.128	0.512	15.63	3.91	60.52	28.21	37.52	9.38	145.24	67.70
3	24.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.76	1.94	1.81	7.74	7.22	0.128	0.512	15.63	3.91	60.52	28.21	37.52	9.38	145.24	67.70
4	25.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.76	1.94	1.81	7.74	7.22	0.128	0.512	15.63	3.91	60.52	28.21	37.52	9.38	145.24	67.70
5	27.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.77	1.94	1.81	7.66	7.15	0.124	0.497	16.11	4.03	61.75	28.79	38.67	9.67	148.19	69.11
6	28.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.79	1.94	1.81	7.59	7.08	0.121	0.482	16.58	4.15	62.94	29.36	39.80	9.95	151.07	70.47
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.79	1.94	1.81	7.59	7.08	0.121	0.482	16.58	4.15	62.94	29.36	39.80	9.95	151.07	70.47

A.9. Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-71	1.00	22.00	19.50	16.50	312.65	142.20	12.15	3.04	170.84	86.65	12.15	3.04
BH-71	1.00	23.50	21.00	18.00	332.38	157.66	12.49	3.12	181.83	95.99	12.49	3.12
BH-71	1.00	25.00	22.50	19.50	352.10	173.12	12.82	3.21	192.81	105.33	12.82	3.21
BH-71	1.00	26.50	24.00	21.00	371.83	188.58	12.82	3.21	203.80	114.67	12.82	3.21
BH-71	1.00	28.00	25.50	22.50	391.56	204.04	13.16	3.29	214.79	124.01	13.16	3.29
BH-71	1.00	29.50	27.00	24.00	411.29	219.50	13.16	3.29	225.78	133.35	13.16	3.29
BH-71	1.00	30.00	27.50	24.50	417.87	224.66	13.48	3.37	229.44	136.47	13.48	3.37
BH-71	1.20	22.00	19.50	16.50	456.22	186.54	15.78	3.95	271.07	119.88	15.78	3.95
BH-71	1.20	23.50	21.00	18.00	483.53	208.03	16.23	4.06	287.89	134.03	16.23	4.06
BH-71	1.20	25.00	22.50	19.50	510.84	229.53	16.66	4.17	304.71	148.18	16.66	4.17
BH-71	1.20	26.50	24.00	21.00	538.15	251.02	16.66	4.17	321.53	162.32	16.66	4.17
BH-71	1.20	28.00	25.50	22.50	565.46	272.51	17.09	4.27	338.35	176.47	17.09	4.27
BH-71	1.20	29.50	27.00	24.00	592.77	294.00	17.09	4.27	355.17	190.62	17.09	4.27
BH-71	1.20	30.00	27.50	24.50	601.88	301.17	17.51	4.38	360.77	195.34	17.51	4.38
BH-72	1.00	22.00	19.50	16.50	298.48	141.49	12.15	3.04	144.49	79.45	12.15	3.04
BH-72	1.00	23.50	21.00	18.00	317.63	156.67	12.49	3.12	153.79	87.72	12.49	3.12
BH-72	1.00	25.00	22.50	19.50	336.96	171.84	12.49	3.12	163.26	95.99	12.49	3.12
BH-72	1.00	26.50	24.00	21.00	372.13	187.49	12.49	3.12	180.72	104.50	12.49	3.12
BH-72	1.00	28.00	25.50	22.50	392.12	203.13	12.82	3.21	190.51	113.00	12.82	3.21

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-72	1.00	29.50	27.00	24.00	412.11	218.77	12.82	3.21	200.31	121.50	12.82	3.21
BH-72	1.00	30.00	27.50	24.50	418.77	223.98	13.16	3.29	203.57	124.34	13.16	3.29
BH-72	1.20	22.00	19.50	16.50	432.40	185.43	15.78	3.95	231.94	110.98	15.78	3.95
BH-72	1.20	23.50	21.00	18.00	458.82	206.50	16.23	4.06	246.52	123.76	16.23	4.06
BH-72	1.20	25.00	22.50	19.50	485.52	227.57	16.23	4.06	261.39	136.55	16.23	4.06
BH-72	1.20	26.50	24.00	21.00	538.35	249.28	16.23	4.06	291.18	149.69	16.23	4.06
BH-72	1.20	28.00	25.50	22.50	565.98	270.99	16.66	4.17	306.56	162.84	16.66	4.17
BH-72	1.20	29.50	27.00	24.00	593.60	292.70	16.66	4.17	321.95	175.98	16.66	4.17
BH-72	1.20	30.00	27.50	24.50	602.81	299.94	17.09	4.27	327.07	180.36	17.09	4.27
BH-73	1.00	22.00	19.50	16.50	312.84	141.63	10.73	2.68	151.04	79.36	10.73	2.68
BH-73	1.00	23.50	21.00	18.00	332.71	157.19	11.10	2.77	160.71	87.78	11.10	2.77
BH-73	1.00	25.00	22.50	19.50	352.58	172.75	11.10	2.77	170.38	96.20	11.10	2.77
BH-73	1.00	26.50	24.00	21.00	372.30	188.31	11.10	2.77	179.90	104.62	11.10	2.77
BH-73	1.00	28.00	25.50	22.50	392.17	203.87	11.10	2.77	189.57	113.04	11.10	2.77
BH-73	1.00	29.50	27.00	24.00	412.04	219.43	11.10	2.77	199.24	121.46	11.10	2.77
BH-73	1.00	30.00	27.50	24.50	418.67	224.61	11.10	2.77	202.47	124.27	11.10	2.77
BH-73	1.20	22.00	19.50	16.50	456.70	185.85	13.94	3.49	245.05	111.13	13.94	3.49
BH-73	1.20	23.50	21.00	18.00	484.18	207.47	14.41	3.60	260.29	124.18	14.41	3.60
BH-73	1.20	25.00	22.50	19.50	511.66	229.08	14.41	3.60	275.54	137.22	14.41	3.60
BH-73	1.20	26.50	24.00	21.00	538.88	250.69	14.41	3.60	290.51	150.27	14.41	3.60
BH-73	1.20	28.00	25.50	22.50	566.36	272.30	14.41	3.60	305.75	163.31	14.41	3.60
BH-73	1.20	29.50	27.00	24.00	593.84	293.91	14.41	3.60	320.99	176.35	14.41	3.60
BH-73	1.20	30.00	27.50	24.50	603.00	301.11	14.41	3.60	326.07	180.70	14.41	3.60
BH-74	1.00	22.00	19.50	18.00	285.10	133.48	11.06	2.77	162.01	83.74	11.06	2.77
BH-74	1.00	23.50	21.00	19.50	302.72	147.46	11.38	2.85	172.34	92.62	11.38	2.85

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-74	1.00	25.00	22.50	21.00	320.34	161.44	11.70	2.93	182.68	101.50	11.70	2.93
BH-74	1.00	26.50	24.00	22.50	337.96	175.42	12.01	3.00	193.01	110.39	12.01	3.00
BH-74	1.00	28.00	25.50	24.00	355.58	189.41	12.01	3.00	203.34	119.27	12.01	3.00
BH-74	1.00	29.50	27.00	25.50	373.20	203.39	12.32	3.08	213.68	128.15	12.32	3.08
BH-74	1.00	30.00	27.50	26.00	379.07	208.05	12.32	3.08	217.12	131.11	12.32	3.08
BH-74	1.20	22.00	19.50	18.00	419.56	176.07	14.39	3.60	259.36	116.39	14.39	3.60
BH-74	1.20	23.50	21.00	19.50	444.33	195.79	14.81	3.70	275.39	129.98	14.81	3.70
BH-74	1.20	25.00	22.50	21.00	469.11	215.51	15.22	3.81	291.42	143.58	15.22	3.81
BH-74	1.20	26.50	24.00	22.50	493.89	235.23	15.63	3.91	307.46	157.18	15.63	3.91
BH-74	1.20	28.00	25.50	24.00	518.66	254.95	15.63	3.91	323.49	170.78	15.63	3.91
BH-74	1.20	29.50	27.00	25.50	543.44	274.67	16.03	4.01	339.53	184.38	16.03	4.01
BH-74	1.20	30.00	27.50	26.00	551.70	281.24	16.03	4.01	344.87	188.91	16.03	4.01
BH-75	1.00	22.00	19.50	15.00	267.94	121.04	9.66	2.41	133.42	70.59	9.66	2.41
BH-75	1.00	23.50	21.00	16.50	285.66	135.10	9.66	2.41	142.40	78.53	9.66	2.41
BH-75	1.00	25.00	22.50	18.00	303.38	149.15	9.66	2.41	151.38	86.46	9.66	2.41
BH-75	1.00	26.50	24.00	19.50	321.11	163.21	10.07	2.52	160.36	94.40	10.07	2.52
BH-75	1.00	28.00	25.50	21.00	338.83	177.27	10.07	2.52	169.34	102.33	10.07	2.52
BH-75	1.00	29.50	27.00	22.50	356.55	191.32	10.07	2.52	178.32	110.27	10.07	2.52
BH-75	1.00	30.00	27.50	23.00	362.46	196.01	10.07	2.52	181.31	112.92	10.07	2.52
BH-75	1.20	22.00	19.50	15.00	386.99	158.16	12.56	3.14	210.58	97.62	12.56	3.14
BH-75	1.20	23.50	21.00	16.50	410.99	177.33	12.56	3.14	224.08	109.45	12.56	3.14
BH-75	1.20	25.00	22.50	18.00	434.98	196.50	12.56	3.14	237.59	121.27	12.56	3.14
BH-75	1.20	26.50	24.00	19.50	458.97	215.67	13.10	3.27	251.09	133.10	13.10	3.27
BH-75	1.20	28.00	25.50	21.00	482.97	234.85	13.10	3.27	264.59	144.93	13.10	3.27
BH-75	1.20	29.50	27.00	22.50	506.96	254.02	13.10	3.27	278.10	156.76	13.10	3.27

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-75	1.20	30.00	27.50	23.00	514.96	260.41	13.10	3.27	282.60	160.70	13.10	3.27
BH-76	1.00	22.00	19.50	16.50	305.10	139.04	9.98	2.50	143.25	76.73	9.98	2.50
BH-76	1.00	23.50	21.00	18.00	324.41	154.20	10.36	2.59	152.36	84.76	10.36	2.59
BH-76	1.00	25.00	22.50	19.50	343.72	169.36	10.73	2.68	161.46	92.78	10.73	2.68
BH-76	1.00	26.50	24.00	21.00	363.02	184.53	11.10	2.77	170.57	100.81	11.10	2.77
BH-76	1.00	28.00	25.50	22.50	382.33	199.69	11.45	2.86	179.68	108.83	11.45	2.86
BH-76	1.00	29.50	27.00	24.00	401.64	214.85	11.80	2.95	188.79	116.86	11.80	2.95
BH-76	1.00	30.00	27.50	24.50	408.07	219.91	11.80	2.95	191.82	119.53	11.80	2.95
BH-76	1.20	22.00	19.50	16.50	441.98	181.75	12.97	3.24	230.27	106.99	12.97	3.24
BH-76	1.20	23.50	21.00	18.00	468.42	202.64	13.46	3.36	244.48	119.31	13.46	3.36
BH-76	1.20	25.00	22.50	19.50	494.87	223.52	13.94	3.49	258.68	131.63	13.94	3.49
BH-76	1.20	26.50	24.00	21.00	521.32	244.41	14.41	3.60	272.89	143.95	14.41	3.60
BH-76	1.20	28.00	25.50	22.50	547.76	265.30	14.88	3.72	287.10	156.27	14.88	3.72
BH-76	1.20	29.50	27.00	24.00	574.21	286.19	15.33	3.83	301.30	168.59	15.33	3.83
BH-76	1.20	30.00	27.50	24.50	583.02	293.15	15.33	3.83	306.04	172.70	15.33	3.83
BH-77	1.00	22.00	19.50	19.50	279.84	129.14	7.60	1.90	140.51	75.32	7.60	1.90
BH-77	1.00	23.50	21.00	21.00	297.64	143.24	7.95	1.99	149.56	83.30	7.95	1.99
BH-77	1.00	25.00	22.50	22.50	315.43	157.34	7.95	1.99	158.62	91.29	7.95	1.99
BH-77	1.00	26.50	24.00	24.00	333.53	171.45	7.95	1.99	167.97	99.27	7.95	1.99
BH-77	1.00	28.00	25.50	25.50	351.32	185.55	8.28	2.07	177.02	107.26	8.28	2.07
BH-77	1.00	29.50	27.00	27.00	369.11	199.66	8.28	2.07	186.08	115.24	8.28	2.07
BH-77	1.00	30.00	27.50	27.50	375.05	204.36	8.61	2.15	189.09	117.90	8.61	2.15
BH-77	1.20	22.00	19.50	19.50	401.98	168.34	9.97	2.49	219.80	103.75	9.97	2.49
BH-77	1.20	23.50	21.00	21.00	426.05	187.57	10.42	2.60	233.38	115.64	10.42	2.60
BH-77	1.20	25.00	22.50	22.50	450.13	206.79	10.42	2.60	246.97	127.53	10.42	2.60

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-77	1.20	26.50	24.00	24.00	474.74	226.02	10.42	2.60	261.09	139.41	10.42	2.60
BH-77	1.20	28.00	25.50	25.50	498.82	245.25	10.85	2.71	274.67	151.30	10.85	2.71
BH-77	1.20	29.50	27.00	27.00	522.89	264.48	10.85	2.71	288.26	163.18	10.85	2.71
BH-77	1.20	30.00	27.50	27.50	530.92	270.89	11.28	2.82	292.79	167.14	11.28	2.82
BH-80	1.00	22.00	19.50	16.50	322.79	144.54	9.59	2.40	162.20	83.13	9.59	2.40
BH-80	1.00	23.50	21.00	18.00	343.47	160.67	9.98	2.50	172.68	92.11	9.98	2.50
BH-80	1.00	25.00	22.50	19.50	364.15	176.79	10.36	2.59	183.16	101.10	10.36	2.59
BH-80	1.00	26.50	24.00	21.00	384.83	192.92	10.73	2.68	193.64	110.09	10.73	2.68
BH-80	1.00	28.00	25.50	22.50	405.51	209.05	11.10	2.77	204.12	119.07	11.10	2.77
BH-80	1.00	29.50	27.00	24.00	426.19	225.17	11.45	2.86	214.60	128.06	11.45	2.86
BH-80	1.00	30.00	27.50	24.50	433.09	230.55	11.45	2.86	218.10	131.05	11.45	2.86
BH-80	1.20	22.00	19.50	16.50	467.23	188.68	12.46	3.12	257.04	114.98	12.46	3.12
BH-80	1.20	23.50	21.00	18.00	495.47	210.82	12.97	3.24	273.03	128.55	12.97	3.24
BH-80	1.20	25.00	22.50	19.50	523.71	232.96	13.46	3.36	289.03	142.12	13.46	3.36
BH-80	1.20	26.50	24.00	21.00	551.94	255.10	13.94	3.49	305.03	155.70	13.94	3.49
BH-80	1.20	28.00	25.50	22.50	580.18	277.24	14.41	3.60	321.03	169.27	14.41	3.60
BH-80	1.20	29.50	27.00	24.00	608.42	299.38	14.88	3.72	337.03	182.85	14.88	3.72
BH-80	1.20	30.00	27.50	24.50	617.83	306.76	14.88	3.72	342.36	187.37	14.88	3.72

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-71	-
Chainage	7+629	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	199.18	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	12.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-71	1.00	22.00	19.50	16.50	312.65	142.20	12.15	3.04
BH-71	1.00	23.50	21.00	18.00	332.38	157.66	12.49	3.12
BH-71	1.00	25.00	22.50	19.50	352.10	173.12	12.82	3.21
BH-71	1.00	26.50	24.00	21.00	371.83	188.58	12.82	3.21
BH-71	1.00	28.00	25.50	22.50	391.56	204.04	13.16	3.29
BH-71	1.00	29.50	27.00	24.00	411.29	219.50	13.16	3.29
BH-71	1.00	30.00	27.50	24.50	417.87	224.66	13.48	3.37

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.10	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.48	51.30	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	19.40	0.03	23	-	6.00	8.68	1.00	-	6.25	7.00	65.85	80.40	4.71	12.50	59.62	72.12	28.85	11.20
4	7.00	8.50	1.50	Granular	19.40	0.03	23	-	6.00	8.68	1.00	-	7.75	8.50	94.95	109.50	4.71	18.03	79.54	110.07	44.03	17.89
5	8.50	10.00	1.50	Granular	19.40	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	124.05	138.60	4.71	26.62	153.22	210.37	84.15	27.00
6	10.00	11.50	1.50	Granular	20.00	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	153.60	168.60	4.71	32.96	184.69	274.81	109.92	37.88
7	11.50	13.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	176.25	183.89	4.71	42.19	298.82	431.12	172.45	51.34
8	13.00	14.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	191.54	199.18	4.71	45.85	323.08	501.23	200.49	65.83
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	199.18	199.18	4.71	47.68	323.08	548.91	219.56	80.83
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	199.18	199.18	4.71	47.68	323.08	596.59	238.63	95.82
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	199.18	199.18	4.71	49.32	360.14	682.97	273.19	111.28
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	199.18	199.18	4.71	49.32	360.14	732.29	292.92	126.74
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	199.18	199.18	4.71	49.32	360.14	781.62	312.65	142.20
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	199.18	199.18	4.71	49.32	360.14	830.94	332.38	157.66
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	199.18	199.18	4.71	49.32	360.14	880.26	352.10	173.12
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	199.18	199.18	4.71	49.32	360.14	929.58	371.83	188.58
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	199.18	199.18	4.71	49.32	360.14	978.91	391.56	204.04
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	199.18	199.18	4.71	49.32	360.14	1028.23	411.29	219.50
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	199.18	199.18	1.57	16.44	360.14	1044.67	417.87	224.66

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
2	22.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
3	24.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
4	25.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
5	27.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21
7	30.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.68	1.95	1.81	6.38	5.94	0.148	0.593	13.48	3.37	42.99	20.00	32.35	8.09	103.19	48.01

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-71	-
Chainage	7+629	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	229.76	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	12.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-71	1.20	22.00	19.50	16.50	456.22	186.54	15.78	3.95
BH-71	1.20	23.50	21.00	18.00	483.53	208.03	16.23	4.06
BH-71	1.20	25.00	22.50	19.50	510.84	229.53	16.66	4.17
BH-71	1.20	26.50	24.00	21.00	538.15	251.02	16.66	4.17
BH-71	1.20	28.00	25.50	22.50	565.46	272.51	17.09	4.27
BH-71	1.20	29.50	27.00	24.00	592.77	294.00	17.09	4.27
BH-71	1.20	30.00	27.50	24.50	601.88	301.17	17.51	4.38

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.10	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.48	51.30	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	19.40	0.03	23	-	6.00	8.68	1.00	-	6.25	7.00	65.85	80.40	5.65	15.00	87.18	102.18	40.87	15.28
4	7.00	8.50	1.50	Granular	19.40	0.03	23	-	6.00	8.68	1.00	-	7.75	8.50	94.95	109.50	5.65	21.63	115.86	152.49	61.00	23.72
5	8.50	10.00	1.50	Granular	19.40	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	124.05	138.60	5.65	31.95	223.26	291.84	116.73	35.04
6	10.00	11.50	1.50	Granular	20.00	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	153.60	168.60	5.65	39.56	268.66	376.80	150.72	48.49
7	11.50	13.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	176.25	183.89	5.65	50.63	432.34	591.10	236.44	65.04
8	13.00	14.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	191.54	199.18	5.65	55.02	467.27	681.05	272.42	82.82
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	206.83	214.47	5.65	59.41	502.20	775.39	310.16	101.83
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	222.12	229.76	5.65	63.80	537.13	874.13	349.65	122.07
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	229.76	229.76	5.65	68.27	598.75	1004.01	401.61	143.56
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	229.76	229.76	5.65	68.27	598.75	1072.29	428.92	165.05
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	229.76	229.76	5.65	68.27	598.75	1140.56	456.22	186.54
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	229.76	229.76	5.65	68.27	598.75	1208.84	483.53	208.03
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	229.76	229.76	5.65	68.27	598.75	1277.11	510.84	229.53
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	229.76	229.76	5.65	68.27	598.75	1345.38	538.15	251.02
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	229.76	229.76	5.65	68.27	598.75	1413.66	565.46	272.51
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	229.76	229.76	5.65	68.27	598.75	1481.93	592.77	294.00
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	229.76	229.76	1.88	22.76	598.75	1504.69	601.88	301.17

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
2	22.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
3	24.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
4	25.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
5	27.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22
7	30.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.45	1.97	1.82	7.45	6.89	0.114	0.457	17.51	4.38	65.28	30.17	42.03	10.51	156.67	72.42

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-72	-
Chainage	7+728	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	201.82	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-72	1.00	22.00	19.50	16.50	298.48	141.49	12.15	3.04
BH-72	1.00	23.50	21.00	18.00	317.63	156.67	12.49	3.12
BH-72	1.00	25.00	22.50	19.50	336.96	171.84	12.49	3.12
BH-72	1.00	26.50	24.00	21.00	372.13	187.49	12.49	3.12
BH-72	1.00	28.00	25.50	22.50	392.12	203.13	12.82	3.21
BH-72	1.00	29.50	27.00	24.00	412.11	218.77	12.82	3.21
BH-72	1.00	30.00	27.50	24.50	418.77	223.98	13.16	3.29

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	38.74	51.83	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	64.91	78.00	4.71	14.47	104.81	119.28	47.71	11.75
4	7.00	8.50	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	91.09	104.18	4.71	20.30	136.80	171.57	68.63	19.08
5	8.50	10.00	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	117.26	130.35	4.71	26.13	168.79	229.69	91.88	28.05
6	10.00	11.50	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	143.44	156.53	4.71	31.97	200.77	293.64	117.46	38.65
7	11.50	13.00	1.50	Granular	20.00	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	171.53	186.53	4.71	39.64	274.31	406.82	162.73	51.40
8	13.00	14.50	1.50	Granular	10.19	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	194.17	201.82	4.71	44.88	289.72	467.10	186.84	65.61
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	201.82	201.82	4.71	48.31	327.26	552.95	221.18	80.79
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	201.82	201.82	4.71	48.31	327.26	601.26	240.51	95.96
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	201.82	201.82	4.71	48.31	327.26	649.57	259.83	111.14
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	201.82	201.82	4.71	48.31	327.26	697.88	279.15	126.32
13	20.50	22.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	201.82	201.82	4.71	48.31	327.26	746.19	298.48	141.49
14	22.00	23.50	1.50	Granular	9.59	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	201.82	201.82	4.71	48.31	326.84	794.09	317.63	156.67
15	23.50	25.00	1.50	Granular	9.59	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	201.82	201.82	4.71	48.31	326.84	842.39	336.96	171.84
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	201.82	201.82	4.71	49.98	364.80	930.33	372.13	187.49
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	201.82	201.82	4.71	49.98	364.80	980.30	392.12	203.13
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	201.82	201.82	4.71	49.98	364.80	1030.28	412.11	218.77
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	201.82	201.82	1.57	16.66	364.80	1046.94	418.77	223.98

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
2	22.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
4	25.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
5	27.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
6	28.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
7	30.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-72	-
Chainage	7+728	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	232.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-72	1.20	22.00	19.50	16.50	432.40	185.43	15.78	3.95
BH-72	1.20	23.50	21.00	18.00	458.82	206.50	16.23	4.06
BH-72	1.20	25.00	22.50	19.50	485.52	227.57	16.23	4.06
BH-72	1.20	26.50	24.00	21.00	538.35	249.28	16.23	4.06
BH-72	1.20	28.00	25.50	22.50	565.98	270.99	16.66	4.17
BH-72	1.20	29.50	27.00	24.00	593.60	292.70	16.66	4.17
BH-72	1.20	30.00	27.50	24.50	602.81	299.94	17.09	4.27

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	38.74	51.83	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	64.91	78.00	5.65	17.36	153.66	171.02	68.41	15.94
4	7.00	8.50	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	91.09	104.18	5.65	24.36	199.72	241.44	96.58	25.14
5	8.50	10.00	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	117.26	130.35	5.65	31.36	245.79	318.87	127.55	36.30
6	10.00	11.50	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	143.44	156.53	5.65	38.36	291.85	403.29	161.32	49.41
7	11.50	13.00	1.50	Granular	20.00	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	171.53	186.53	5.65	47.57	398.57	557.59	223.03	65.11
8	13.00	14.50	1.50	Granular	10.19	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	194.17	201.82	5.65	53.85	419.01	631.87	252.75	82.56
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	209.46	217.11	5.65	60.17	508.22	781.25	312.50	101.78
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	224.75	232.40	5.65	64.56	543.15	880.74	352.30	122.23
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	232.40	232.40	5.65	66.76	543.15	947.50	379.00	143.30
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	232.40	232.40	5.65	66.76	543.15	1014.25	405.70	164.37
13	20.50	22.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	232.40	232.40	5.65	66.76	543.15	1081.01	432.40	185.43
14	22.00	23.50	1.50	Granular	9.59	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	232.40	232.40	5.65	66.76	542.43	1147.04	458.82	206.50
15	23.50	25.00	1.50	Granular	9.59	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	232.40	232.40	5.65	66.76	542.43	1213.80	485.52	227.57
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	232.40	232.40	5.65	69.06	605.46	1345.88	538.35	249.28
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	232.40	232.40	5.65	69.06	605.46	1414.94	565.98	270.99
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	232.40	232.40	5.65	69.06	605.46	1484.00	593.60	292.70
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	232.40	232.40	1.88	23.02	605.46	1507.01	602.81	299.94

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
2	22.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
4	25.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
5	27.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
6	28.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
7	30.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-73	-
Chainage	7+837	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	200.62	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-73	1.00	22.00	19.50	16.50	312.84	141.63	10.73	2.68
BH-73	1.00	23.50	21.00	18.00	332.71	157.19	11.10	2.77
BH-73	1.00	25.00	22.50	19.50	352.58	172.75	11.10	2.77
BH-73	1.00	26.50	24.00	21.00	372.30	188.31	11.10	2.77
BH-73	1.00	28.00	25.50	22.50	392.17	203.87	11.10	2.77
BH-73	1.00	29.50	27.00	24.00	412.04	219.43	11.10	2.77
BH-73	1.00	30.00	27.50	24.50	418.67	224.61	11.10	2.77

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	38.48	51.30	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.45	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	64.39	77.48	4.71	12.76	65.24	77.99	31.20	11.27
4	7.00	8.50	1.50	Granular	17.45	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	90.56	103.65	4.71	17.94	85.42	116.12	46.45	17.94
5	8.50	10.00	1.50	Granular	17.45	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	116.74	129.83	4.71	25.05	143.18	198.93	79.57	26.61
6	10.00	11.50	1.50	Granular	19.00	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	144.08	158.33	4.71	30.92	173.54	260.21	104.08	36.91
7	11.50	13.00	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	172.58	186.83	4.71	41.31	309.58	437.56	175.03	50.13
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	193.72	200.62	4.71	46.37	324.66	499.01	199.60	64.76
9	14.50	16.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	200.62	200.62	4.71	48.02	325.35	547.73	219.09	79.86
10	16.00	17.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	200.62	200.62	4.71	48.02	325.35	595.75	238.30	94.95
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	200.62	200.62	4.71	49.68	362.68	682.75	273.10	110.51
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	200.62	200.62	4.71	49.68	362.68	732.43	292.97	126.07
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	200.62	200.62	4.71	49.68	362.68	782.11	312.84	141.63
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	200.62	200.62	4.71	49.68	362.68	831.78	332.71	157.19
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	200.62	200.62	4.71	49.68	362.68	881.46	352.58	172.75
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	200.62	200.62	4.71	49.68	362.29	930.76	372.30	188.31
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	200.62	200.62	4.71	49.68	362.29	980.43	392.17	203.87
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	200.62	200.62	4.71	49.68	362.29	1030.11	412.04	219.43
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	200.62	200.62	1.57	16.56	362.29	1046.67	418.67	224.61

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
2	22.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
3	24.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
6	28.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
7	30.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-73	-
Chainage	7+837	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	231.20	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-73	1.20	22.00	19.50	16.50	456.70	185.85	13.94	3.49
BH-73	1.20	23.50	21.00	18.00	484.18	207.47	14.41	3.60
BH-73	1.20	25.00	22.50	19.50	511.66	229.08	14.41	3.60
BH-73	1.20	26.50	24.00	21.00	538.88	250.69	14.41	3.60
BH-73	1.20	28.00	25.50	22.50	566.36	272.30	14.41	3.60
BH-73	1.20	29.50	27.00	24.00	593.84	293.91	14.41	3.60
BH-73	1.20	30.00	27.50	24.50	603.00	301.11	14.41	3.60

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	38.48	51.30	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.45	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	64.39	77.48	5.65	15.31	95.53	110.83	44.33	15.37
4	7.00	8.50	1.50	Granular	17.45	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	90.56	103.65	5.65	21.53	124.59	161.43	64.57	23.77
5	8.50	10.00	1.50	Granular	17.45	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	116.74	129.83	5.65	30.06	208.54	275.43	110.17	34.57
6	10.00	11.50	1.50	Granular	19.00	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	144.08	158.33	5.65	37.10	252.47	356.47	142.59	47.33
7	11.50	13.00	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	172.58	186.83	5.65	49.57	449.60	603.17	241.27	63.58
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	193.72	200.62	5.65	55.65	469.35	678.57	271.43	81.54
9	14.50	16.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	208.26	215.91	5.65	59.82	505.48	774.52	309.81	100.67
10	16.00	17.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	223.55	231.20	5.65	64.21	540.41	873.67	349.47	121.02
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	231.20	231.20	5.65	68.70	602.40	1004.36	401.74	142.63
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	231.20	231.20	5.65	68.70	602.40	1073.06	429.22	164.24
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	231.20	231.20	5.65	68.70	602.40	1141.76	456.70	185.85
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	231.20	231.20	5.65	68.70	602.40	1210.46	484.18	207.47
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	231.20	231.20	5.65	68.70	602.40	1279.16	511.66	229.08
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	231.20	231.20	5.65	68.70	601.74	1347.20	538.88	250.69
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	231.20	231.20	5.65	68.70	601.74	1415.90	566.36	272.30
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	231.20	231.20	5.65	68.70	601.74	1484.60	593.84	293.91
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	231.20	231.20	1.88	22.90	601.74	1507.50	603.00	301.11

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
2	22.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
3	24.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
6	28.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
7	30.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-74	-
Chainage	7+912	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	177.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	11.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-74	1.00	22.00	19.50	18.00	285.10	133.48	11.06	2.77
BH-74	1.00	23.50	21.00	19.50	302.72	147.46	11.38	2.85
BH-74	1.00	25.00	22.50	21.00	320.34	161.44	11.70	2.93
BH-74	1.00	26.50	24.00	22.50	337.96	175.42	12.01	3.00
BH-74	1.00	28.00	25.50	24.00	355.58	189.41	12.01	3.00
BH-74	1.00	29.50	27.00	25.50	373.20	203.39	12.32	3.08
BH-74	1.00	30.00	27.50	26.00	379.07	208.05	12.32	3.08

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	13.09	26.18	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	39.26	52.35	4.71	7.45	39.96	47.41	18.97	8.13
3	5.50	7.00	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	65.44	78.53	4.71	14.58	105.45	127.49	51.00	13.87
4	7.00	8.50	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	91.61	104.70	4.71	20.42	137.44	179.90	71.96	21.23
5	8.50	10.00	1.50	Granular	19.40	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	119.25	133.80	4.71	26.58	174.06	243.10	97.24	30.32
6	10.00	11.50	1.50	Granular	9.59	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	141.00	148.19	4.71	31.42	186.32	286.77	114.71	40.77
7	11.50	13.00	1.50	Granular	9.59	0.11	27	-	13.80	15.50	1.00	-	12.25	13.00	155.39	162.58	4.71	34.63	203.90	338.99	135.59	52.12
8	13.00	14.50	1.50	Granular	10.19	0.11	27	-	13.80	15.50	1.00	-	13.75	14.50	170.23	177.87	4.71	37.94	222.91	395.93	158.37	64.39
9	14.50	16.00	1.50	Granular	10.19	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	177.87	177.87	4.71	42.58	289.27	504.87	201.95	77.96
10	16.00	17.50	1.50	Granular	10.19	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	177.87	177.87	4.71	42.58	289.27	547.45	218.98	91.53
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	177.87	177.87	4.71	44.05	322.45	624.67	249.87	105.51
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	177.87	177.87	4.71	44.05	322.45	668.71	267.49	119.50
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	177.87	177.87	4.71	44.05	322.45	712.76	285.10	133.48
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	177.87	177.87	4.71	44.05	322.45	756.81	302.72	147.46
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	177.87	177.87	4.71	44.05	322.45	800.85	320.34	161.44
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	177.87	177.87	4.71	44.05	322.45	844.90	337.96	175.42
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	177.87	177.87	4.71	44.05	322.45	888.94	355.58	189.41
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	177.87	177.87	4.71	44.05	322.45	932.99	373.20	203.39
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	177.87	177.87	1.57	14.68	322.45	947.67	379.07	208.05

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
4	25.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
5	27.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	30.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-74	-
Chainage	7+912	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	208.45	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	11.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-74	1.20	22.00	19.50	18.00	419.56	176.07	14.39	3.60
BH-74	1.20	23.50	21.00	19.50	444.33	195.79	14.81	3.70
BH-74	1.20	25.00	22.50	21.00	469.11	215.51	15.22	3.81
BH-74	1.20	26.50	24.00	22.50	493.89	235.23	15.63	3.91
BH-74	1.20	28.00	25.50	24.00	518.66	254.95	15.63	3.91
BH-74	1.20	29.50	27.00	25.50	543.44	274.67	16.03	4.01
BH-74	1.20	30.00	27.50	26.00	551.70	281.24	16.03	4.01

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	13.09	26.18	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	39.26	52.35	5.65	8.94	58.73	67.68	27.07	11.21
3	5.50	7.00	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	65.44	78.53	5.65	17.50	154.59	181.03	72.41	18.49
4	7.00	8.50	1.50	Granular	17.45	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	91.61	104.70	5.65	24.50	200.65	251.59	100.64	27.72
5	8.50	10.00	1.50	Granular	19.40	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	119.25	133.80	5.65	31.89	253.69	336.53	134.61	39.03
6	10.00	11.50	1.50	Granular	9.59	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	141.00	148.19	5.65	37.71	269.80	390.34	156.14	51.96
7	11.50	13.00	1.50	Granular	9.59	0.11	27	-	13.80	15.50	1.00	-	12.25	13.00	155.39	162.58	5.65	41.56	295.12	457.22	182.89	65.97
8	13.00	14.50	1.50	Granular	10.19	0.11	27	-	13.80	15.50	1.00	-	13.75	14.50	170.23	177.87	5.65	45.52	322.59	530.22	212.09	81.09
9	14.50	16.00	1.50	Granular	10.19	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	185.52	193.16	5.65	53.29	453.51	714.43	285.77	98.39
10	16.00	17.50	1.50	Granular	10.19	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	200.81	208.45	5.65	57.68	488.45	807.04	322.82	116.92
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	208.45	208.45	5.65	61.94	544.47	925.01	370.00	136.63
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	208.45	208.45	5.65	61.94	544.47	986.95	394.78	156.35
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	208.45	208.45	5.65	61.94	544.47	1048.89	419.56	176.07
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	208.45	208.45	5.65	61.94	544.47	1110.83	444.33	195.79
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	208.45	208.45	5.65	61.94	544.47	1172.77	469.11	215.51
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	208.45	208.45	5.65	61.94	544.47	1234.71	493.89	235.23
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	208.45	208.45	5.65	61.94	544.47	1296.66	518.66	254.95
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	208.45	208.45	5.65	61.94	544.47	1358.60	543.44	274.67
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	208.45	208.45	1.88	20.65	544.47	1379.25	551.70	281.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
4	25.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
5	27.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	30.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-75	-
Chainage	8+031	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	178.93	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	12.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-75	1.00	22.00	19.50	15.00	267.94	121.04	9.66	2.41
BH-75	1.00	23.50	21.00	16.50	285.66	135.10	9.66	2.41
BH-75	1.00	25.00	22.50	18.00	303.38	149.15	9.66	2.41
BH-75	1.00	26.50	24.00	19.50	321.11	163.21	10.07	2.52
BH-75	1.00	28.00	25.50	21.00	338.83	177.27	10.07	2.52
BH-75	1.00	29.50	27.00	22.50	356.55	191.32	10.07	2.52
BH-75	1.00	30.00	27.50	23.00	362.46	196.01	10.07	2.52

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	12.83	25.65	4.71	2.43	0.00	2.43	0.97	5.08
2	4.00	5.50	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	38.48	51.30	4.71	7.30	0.00	9.74	3.90	8.77
3	5.50	7.00	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	6.25	7.00	64.39	77.48	4.71	12.22	0.00	21.96	8.79	13.85
4	7.00	8.50	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	7.75	8.50	90.56	103.65	4.71	17.19	75.07	114.23	45.69	20.31
5	8.50	10.00	1.50	Granular	17.45	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	116.74	129.83	4.71	24.09	118.21	181.46	72.58	28.70
6	10.00	11.50	1.50	Granular	17.45	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	142.91	156.00	4.71	29.49	140.66	233.40	93.36	38.61
7	11.50	13.00	1.50	Granular	7.64	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	161.73	167.47	4.71	37.38	239.90	370.02	148.01	50.73
8	13.00	14.50	1.50	Granular	7.64	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	173.20	178.93	4.71	40.03	256.00	426.15	170.46	63.58
9	14.50	16.00	1.50	Granular	7.64	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	178.93	178.93	4.71	0.00	289.18	459.33	183.73	65.23
10	16.00	17.50	1.50	Granular	7.64	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	178.93	178.93	4.71	42.83	289.18	502.16	200.86	78.88
11	17.50	19.00	1.50	Granular	7.64	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	178.93	178.93	4.71	44.31	322.36	579.65	231.86	92.93
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	178.93	178.93	4.71	44.31	323.94	625.53	250.21	106.99
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	178.93	178.93	4.71	44.31	323.94	669.84	267.94	121.04
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	178.93	178.93	4.71	44.31	323.94	714.15	285.66	135.10
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	178.93	178.93	4.71	44.31	323.94	758.45	303.38	149.15
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	178.93	178.93	4.71	44.31	323.94	802.76	321.11	163.21
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	178.93	178.93	4.71	44.31	323.94	847.07	338.83	177.27
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	178.93	178.93	4.71	44.31	323.94	891.38	356.55	191.32
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	178.93	178.93	1.57	14.77	323.94	906.15	362.46	196.01

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	4.91E-02	2.12E+03	3.69	1.90	1.93	1.81	7.13	6.67	0.207	0.828	9.66	2.41	34.43	16.10	23.18	5.80	82.63	38.64
2	22.50	15	2.96E+07	4.91E-02	2.12E+03	3.69	1.90	1.93	1.81	7.13	6.67	0.207	0.828	9.66	2.41	34.43	16.10	23.18	5.80	82.63	38.64
3	24.00	15	2.96E+07	4.91E-02	2.12E+03	3.69	1.90	1.93	1.81	7.13	6.67	0.207	0.828	9.66	2.41	34.43	16.10	23.18	5.80	82.63	38.64
4	25.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76
5	27.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76
6	28.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76
7	30.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-75	-
Chainage	8+031	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	201.86	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	12.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-75	1.20	22.00	19.50	15.00	386.99	158.16	12.56	3.14
BH-75	1.20	23.50	21.00	16.50	410.99	177.33	12.56	3.14
BH-75	1.20	25.00	22.50	18.00	434.98	196.50	12.56	3.14
BH-75	1.20	26.50	24.00	19.50	458.97	215.67	13.10	3.27
BH-75	1.20	28.00	25.50	21.00	482.97	234.85	13.10	3.27
BH-75	1.20	29.50	27.00	22.50	506.96	254.02	13.10	3.27
BH-75	1.20	30.00	27.50	23.00	514.96	260.41	13.10	3.27

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	12.83	25.65	5.65	2.92	0.00	2.92	1.17	7.15
2	4.00	5.50	1.50	Granular	17.10	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	38.48	51.30	5.65	8.77	0.00	11.69	4.67	11.98
3	5.50	7.00	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	6.25	7.00	64.39	77.48	5.65	14.67	0.00	26.36	10.54	18.46
4	7.00	8.50	1.50	Granular	17.45	0.03	23	-	6.00	8.68	1.00	-	7.75	8.50	90.56	103.65	5.65	20.63	109.30	156.28	62.51	26.62
5	8.50	10.00	1.50	Granular	17.45	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	116.74	129.83	5.65	28.91	172.21	248.10	99.24	37.08
6	10.00	11.50	1.50	Granular	17.45	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	142.91	156.00	5.65	35.39	204.53	315.82	126.33	49.37
7	11.50	13.00	1.50	Granular	7.64	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	161.73	167.47	5.65	44.86	346.82	502.96	201.18	64.30
8	13.00	14.50	1.50	Granular	7.64	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	173.20	178.93	5.65	48.04	370.00	574.18	229.67	80.13
9	14.50	16.00	1.50	Granular	7.64	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	184.66	190.40	5.65	0.00	444.14	648.32	259.33	82.50
10	16.00	17.50	1.50	Granular	7.64	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	196.13	201.86	5.65	56.34	470.33	730.85	292.34	100.65
11	17.50	19.00	1.50	Granular	7.64	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	201.86	201.86	5.65	59.98	524.30	844.79	337.92	119.82
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	201.86	201.86	5.65	59.98	527.02	907.50	363.00	138.99
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	201.86	201.86	5.65	59.98	527.02	967.48	386.99	158.16
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	201.86	201.86	5.65	59.98	527.02	1027.47	410.99	177.33
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	201.86	201.86	5.65	59.98	527.02	1087.45	434.98	196.50
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	201.86	201.86	5.65	59.98	527.02	1147.43	458.97	215.67
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	201.86	201.86	5.65	59.98	527.02	1207.42	482.97	234.85
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	201.86	201.86	5.65	59.98	527.02	1267.40	506.96	254.02
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	201.86	201.86	1.88	19.99	527.02	1287.39	514.96	260.41

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	1.02E-01	2.12E+03	4.27	1.64	1.95	1.81	8.33	7.74	0.159	0.637	12.56	3.14	52.30	24.30	30.14	7.54	125.51	58.33
2	22.50	15	2.96E+07	1.02E-01	2.12E+03	4.27	1.64	1.95	1.81	8.33	7.74	0.159	0.637	12.56	3.14	52.30	24.30	30.14	7.54	125.51	58.33
3	24.00	15	2.96E+07	1.02E-01	2.12E+03	4.27	1.64	1.95	1.81	8.33	7.74	0.159	0.637	12.56	3.14	52.30	24.30	30.14	7.54	125.51	58.33
4	25.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03
5	27.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03
6	28.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03
7	30.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-76	-
Chainage	8+069	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	194.92	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	14.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-76	1.00	22.00	19.50	16.50	305.10	139.04	9.98	2.50
BH-76	1.00	23.50	21.00	18.00	324.41	154.20	10.36	2.59
BH-76	1.00	25.00	22.50	19.50	343.72	169.36	10.73	2.68
BH-76	1.00	26.50	24.00	21.00	363.02	184.53	11.10	2.77
BH-76	1.00	28.00	25.50	22.50	382.33	199.69	11.45	2.86
BH-76	1.00	29.50	27.00	24.00	401.64	214.85	11.80	2.95
BH-76	1.00	30.00	27.50	24.50	408.07	219.91	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.45	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.74	51.83	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.45	0.04	27	-	13.80	15.50	1.00	-	6.25	7.00	64.91	78.00	4.71	14.47	104.81	119.28	47.71	11.75
4	7.00	8.50	1.50	Granular	17.45	0.04	27	-	13.80	15.50	1.00	-	7.75	8.50	91.09	104.18	4.71	20.30	136.80	171.57	68.63	19.08
5	8.50	10.00	1.50	Granular	17.10	0.04	27	-	13.80	15.50	1.00	-	9.25	10.00	117.00	129.83	4.71	26.08	167.95	228.80	91.52	28.03
6	10.00	11.50	1.50	Granular	17.10	0.04	27	-	13.80	15.50	1.00	-	10.75	11.50	142.65	155.48	4.71	31.79	199.30	291.93	116.77	38.58
7	11.50	13.00	1.50	Granular	17.10	0.05	27	-	13.80	15.50	1.00	-	12.25	13.00	168.30	181.13	4.71	37.51	230.65	360.79	144.32	50.73
8	13.00	14.50	1.50	Granular	9.19	0.05	27	-	13.80	15.50	1.00	-	13.75	14.50	188.02	194.92	4.71	41.90	243.20	415.24	166.10	64.12
9	14.50	16.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	194.92	194.92	4.71	46.66	315.62	534.32	213.73	78.83
10	16.00	17.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	194.92	194.92	4.71	46.66	315.62	580.98	232.39	93.54
11	17.50	19.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	194.92	194.92	4.71	48.27	352.60	666.22	266.49	108.71
12	19.00	20.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	194.92	194.92	4.71	48.27	352.60	714.49	285.80	123.87
13	20.50	22.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	194.92	194.92	4.71	48.27	352.60	762.76	305.10	139.04
14	22.00	23.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	194.92	194.92	4.71	48.27	352.60	811.02	324.41	154.20
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	194.92	194.92	4.71	48.27	352.60	859.29	343.72	169.36
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	194.92	194.92	4.71	48.27	352.60	907.55	363.02	184.53
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	194.92	194.92	4.71	48.27	352.60	955.82	382.33	199.69
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	194.92	194.92	4.71	48.27	352.60	1004.09	401.64	214.85
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	194.92	194.92	1.57	16.09	352.60	1020.18	408.07	219.91

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
5	27.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
6	28.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-76	-
Chainage	8+069	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	222.50	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	14.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-76	1.20	22.00	19.50	16.50	441.98	181.75	12.97	3.24
BH-76	1.20	23.50	21.00	18.00	468.42	202.64	13.46	3.36
BH-76	1.20	25.00	22.50	19.50	494.87	223.52	13.94	3.49
BH-76	1.20	26.50	24.00	21.00	521.32	244.41	14.41	3.60
BH-76	1.20	28.00	25.50	22.50	547.76	265.30	14.88	3.72
BH-76	1.20	29.50	27.00	24.00	574.21	286.19	15.33	3.83
BH-76	1.20	30.00	27.50	24.50	583.02	293.15	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.45	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.74	51.83	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.45	0.04	27	-	13.80	15.50	1.00	-	6.25	7.00	64.91	78.00	5.65	17.36	153.66	171.02	68.41	15.94
4	7.00	8.50	1.50	Granular	17.45	0.04	27	-	13.80	15.50	1.00	-	7.75	8.50	91.09	104.18	5.65	24.36	199.72	241.44	96.58	25.14
5	8.50	10.00	1.50	Granular	17.10	0.04	27	-	13.80	15.50	1.00	-	9.25	10.00	117.00	129.83	5.65	31.29	244.53	317.54	127.02	36.28
6	10.00	11.50	1.50	Granular	17.10	0.04	27	-	13.80	15.50	1.00	-	10.75	11.50	142.65	155.48	5.65	38.15	289.67	400.83	160.33	49.33
7	11.50	13.00	1.50	Granular	17.10	0.05	27	-	13.80	15.50	1.00	-	12.25	13.00	168.30	181.13	5.65	45.01	334.81	490.98	196.39	64.31
8	13.00	14.50	1.50	Granular	9.19	0.05	27	-	13.80	15.50	1.00	-	13.75	14.50	188.02	194.92	5.65	50.28	351.65	558.10	223.24	80.77
9	14.50	16.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	201.81	208.71	5.65	57.97	487.83	752.25	300.90	99.37
10	16.00	17.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	215.60	222.50	5.65	61.93	519.34	845.69	338.28	119.09
11	17.50	19.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	222.50	222.50	5.65	66.12	580.24	972.71	389.08	139.98
12	19.00	20.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	222.50	222.50	5.65	66.12	580.24	1038.83	415.53	160.86
13	20.50	22.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	222.50	222.50	5.65	66.12	580.24	1104.94	441.98	181.75
14	22.00	23.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	222.50	222.50	5.65	66.12	580.24	1171.06	468.42	202.64
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	222.50	222.50	5.65	66.12	580.24	1237.17	494.87	223.52
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	222.50	222.50	5.65	66.12	580.24	1303.29	521.32	244.41
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	222.50	222.50	5.65	66.12	580.24	1369.40	547.76	265.30
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	222.50	222.50	5.65	66.12	580.24	1435.52	574.21	286.19
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	222.50	222.50	1.88	22.04	580.24	1457.56	583.02	293.15

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
5	27.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
6	28.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-77	-
Chainage	8+226	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	179.64	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	12.40	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-77	1.00	22.00	19.50	19.50	279.84	129.14	7.60	1.90
BH-77	1.00	23.50	21.00	21.00	297.64	143.24	7.95	1.99
BH-77	1.00	25.00	22.50	22.50	315.43	157.34	7.95	1.99
BH-77	1.00	26.50	24.00	24.00	333.53	171.45	7.95	1.99
BH-77	1.00	28.00	25.50	25.50	351.32	185.55	8.28	2.07
BH-77	1.00	29.50	27.00	27.00	369.11	199.66	8.28	2.07
BH-77	1.00	30.00	27.50	27.50	375.05	204.36	8.61	2.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.86	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	13.40	26.79	4.71	2.54	22.56	25.10	10.04	5.11
2	4.00	5.50	1.50	Granular	17.86	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	40.19	53.58	4.71	0.00	40.90	43.44	17.38	6.76
3	5.50	7.00	1.50	Granular	17.10	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	66.41	79.23	4.71	0.00	74.69	77.23	30.89	8.41
4	7.00	8.50	1.50	Granular	17.10	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	92.06	104.88	4.71	19.00	96.68	118.22	47.29	15.38
5	8.50	10.00	1.50	Granular	17.10	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	117.71	130.53	4.71	25.26	143.75	190.55	76.22	24.10
6	10.00	11.50	1.50	Granular	17.45	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	143.62	156.71	4.71	30.82	171.13	248.75	99.50	34.38
7	11.50	13.00	1.50	Granular	7.64	0.06	28	-	15.70	17.82	1.00	-	12.25	13.00	162.44	168.17	4.71	37.54	240.89	356.06	142.42	46.54
8	13.00	14.50	1.50	Granular	7.64	0.06	28	-	15.70	17.82	1.00	-	13.75	14.50	173.90	179.64	4.71	40.19	256.99	412.35	164.94	59.44
9	14.50	16.00	1.50	Granular	7.64	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	179.64	179.64	4.71	43.00	290.30	488.66	195.46	73.13
10	16.00	17.50	1.50	Granular	7.64	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	179.64	179.64	4.71	43.00	290.30	531.66	212.66	86.82
11	17.50	19.00	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	179.64	179.64	4.71	44.48	324.80	610.64	244.26	100.93
12	19.00	20.50	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	179.64	179.64	4.71	44.48	324.80	655.12	262.05	115.03
13	20.50	22.00	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	21.25	22.00	179.64	179.64	4.71	44.48	324.80	699.60	279.84	129.14
14	22.00	23.50	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	22.75	23.50	179.64	179.64	4.71	44.48	324.80	744.09	297.64	143.24
15	23.50	25.00	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	24.25	25.00	179.64	179.64	4.71	44.48	324.80	788.57	315.43	157.34
16	25.00	26.50	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	25.75	26.50	179.64	179.64	4.71	44.48	325.57	833.82	333.53	171.45
17	26.50	28.00	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	27.25	28.00	179.64	179.64	4.71	44.48	325.57	878.30	351.32	185.55
18	28.00	29.50	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	28.75	29.50	179.64	179.64	4.71	44.48	325.57	922.79	369.11	199.66
19	29.50	30.00	0.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	29.75	30.00	179.64	179.64	1.57	14.83	325.57	937.61	375.05	204.36

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	14	2.96E+07	4.91E-02	1.98E+03	3.74	0.67	2.06	1.85	7.72	6.92	0.263	1.052	7.60	1.90	29.35	13.15	18.24	4.56	70.43	31.55
2	22.50	15	2.96E+07	4.91E-02	2.12E+03	3.69	0.68	2.06	1.85	7.61	6.82	0.252	1.007	7.95	1.99	30.23	13.55	19.07	4.77	72.55	32.51
3	24.00	15	2.96E+07	4.91E-02	2.12E+03	3.69	0.68	2.06	1.85	7.61	6.82	0.252	1.007	7.95	1.99	30.23	13.55	19.07	4.77	72.55	32.51
4	25.50	15	2.96E+07	4.91E-02	2.12E+03	3.69	0.68	2.06	1.85	7.61	6.82	0.252	1.007	7.95	1.99	30.23	13.55	19.07	4.77	72.55	32.51
5	27.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
6	28.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
7	30.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-77	-
Chainage	8+226	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	202.57	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	12.40	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-77	1.20	22.00	19.50	19.50	401.98	168.34	9.97	2.49
BH-77	1.20	23.50	21.00	21.00	426.05	187.57	10.42	2.60
BH-77	1.20	25.00	22.50	22.50	450.13	206.79	10.42	2.60
BH-77	1.20	26.50	24.00	24.00	474.74	226.02	10.42	2.60
BH-77	1.20	28.00	25.50	25.50	498.82	245.25	10.85	2.71
BH-77	1.20	29.50	27.00	27.00	522.89	264.48	10.85	2.71
BH-77	1.20	30.00	27.50	27.50	530.92	270.89	11.28	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.86	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	13.40	26.79	5.65	3.05	33.70	36.76	14.70	7.19
2	4.00	5.50	1.50	Granular	17.86	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	40.19	53.58	5.65	0.00	60.11	63.16	25.26	9.56
3	5.50	7.00	1.50	Granular	17.10	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	66.41	79.23	5.65	0.00	109.49	112.54	45.02	11.94
4	7.00	8.50	1.50	Granular	17.10	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	92.06	104.88	5.65	22.80	141.16	167.01	66.80	20.70
5	8.50	10.00	1.50	Granular	17.10	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	117.71	130.53	5.65	30.31	209.31	265.47	106.19	31.56
6	10.00	11.50	1.50	Granular	17.45	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	143.62	156.71	5.65	36.99	248.78	341.93	136.77	44.29
7	11.50	13.00	1.50	Granular	7.64	0.06	28	-	15.70	17.82	1.00	-	12.25	13.00	162.44	168.17	5.65	45.05	348.25	486.44	194.58	59.28
8	13.00	14.50	1.50	Granular	7.64	0.06	28	-	15.70	17.82	1.00	-	13.75	14.50	173.90	179.64	5.65	48.23	371.43	557.86	223.14	75.16
9	14.50	16.00	1.50	Granular	7.64	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	185.37	191.10	5.65	53.25	445.75	685.43	274.17	92.44
10	16.00	17.50	1.50	Granular	7.64	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	196.83	202.57	5.65	56.54	471.95	768.16	307.26	110.65
11	17.50	19.00	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	202.57	202.57	5.65	60.19	528.15	884.56	353.82	129.88
12	19.00	20.50	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	202.57	202.57	5.65	60.19	528.15	944.75	377.90	149.11
13	20.50	22.00	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	21.25	22.00	202.57	202.57	5.65	60.19	528.15	1004.94	401.98	168.34
14	22.00	23.50	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	22.75	23.50	202.57	202.57	5.65	60.19	528.15	1065.14	426.05	187.57
15	23.50	25.00	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	24.25	25.00	202.57	202.57	5.65	60.19	528.15	1125.33	450.13	206.79
16	25.00	26.50	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	25.75	26.50	202.57	202.57	5.65	60.19	529.48	1186.85	474.74	226.02
17	26.50	28.00	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	27.25	28.00	202.57	202.57	5.65	60.19	529.48	1247.04	498.82	245.25
18	28.00	29.50	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	28.75	29.50	202.57	202.57	5.65	60.19	529.48	1307.24	522.89	264.48
19	29.50	30.00	0.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	29.75	30.00	202.57	202.57	1.88	20.06	529.48	1327.30	530.92	270.89

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	14	2.96E+07	1.02E-01	1.98E+03	4.33	0.58	2.08	1.85	9.00	8.02	0.201	0.803	9.97	2.49	44.83	19.99	23.92	5.98	107.58	47.97
2	22.50	15	2.96E+07	1.02E-01	2.12E+03	4.27	0.59	2.08	1.85	8.86	7.91	0.192	0.768	10.42	2.60	46.16	20.59	25.00	6.25	110.80	49.43
3	24.00	15	2.96E+07	1.02E-01	2.12E+03	4.27	0.59	2.08	1.85	8.86	7.91	0.192	0.768	10.42	2.60	46.16	20.59	25.00	6.25	110.80	49.43
4	25.50	15	2.96E+07	1.02E-01	2.12E+03	4.27	0.59	2.08	1.85	8.86	7.91	0.192	0.768	10.42	2.60	46.16	20.59	25.00	6.25	110.80	49.43
5	27.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
6	28.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
7	30.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-80	-
Chainage	8+551	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	237.57	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	13.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-80	1.20	22.00	19.50	16.50	467.23	188.68	12.46	3.12
BH-80	1.20	23.50	21.00	18.00	495.47	210.82	12.97	3.24
BH-80	1.20	25.00	22.50	19.50	523.71	232.96	13.46	3.36
BH-80	1.20	26.50	24.00	21.00	551.94	255.10	13.94	3.49
BH-80	1.20	28.00	25.50	22.50	580.18	277.24	14.41	3.60
BH-80	1.20	29.50	27.00	24.00	608.42	299.38	14.88	3.72
BH-80	1.20	30.00	27.50	24.50	617.83	306.76	14.88	3.72

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.45	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	38.74	51.83	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.45	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	64.91	78.00	5.65	16.07	108.21	124.28	49.71	15.58
4	7.00	8.50	1.50	Granular	19.40	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	92.55	107.10	5.65	22.92	145.47	184.46	73.79	24.38
5	8.50	10.00	1.50	Granular	19.40	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	121.65	136.20	5.65	32.53	257.91	329.44	131.78	35.86
6	10.00	11.50	1.50	Granular	19.40	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	150.75	165.30	5.65	40.32	309.12	420.97	168.39	49.52
7	11.50	13.00	1.50	Granular	19.40	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	179.85	194.40	5.65	48.10	360.33	520.27	208.11	65.37
8	13.00	14.50	1.50	Granular	9.59	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	201.60	208.79	5.65	53.91	376.44	590.29	236.12	82.84
9	14.50	16.00	1.50	Granular	9.59	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	215.99	223.18	5.65	59.90	461.57	735.33	294.13	101.99
10	16.00	17.50	1.50	Granular	9.59	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	230.38	237.57	5.65	63.89	490.67	828.32	331.33	122.25
11	17.50	19.00	1.50	Granular	9.59	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	237.57	237.57	5.65	70.59	617.84	1026.09	410.43	144.39
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	237.57	237.57	5.65	70.59	618.64	1097.48	438.99	166.53
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	237.57	237.57	5.65	70.59	618.64	1168.07	467.23	188.68
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	237.57	237.57	5.65	70.59	618.64	1238.67	495.47	210.82
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	237.57	237.57	5.65	70.59	618.64	1309.26	523.71	232.96
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	237.57	237.57	5.65	70.59	618.64	1379.86	551.94	255.10
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	237.57	237.57	5.65	70.59	618.64	1450.45	580.18	277.24
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	237.57	237.57	5.65	70.59	618.64	1521.05	608.42	299.38
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	237.57	237.57	1.88	23.53	618.64	1544.58	617.83	306.76

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.30	1.98	1.82	8.35	7.68	0.160	0.642	12.46	3.12	52.04	23.94	29.92	7.48	124.89	57.46
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
7	30.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-80	-
Chainage	8+551	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	208.79	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	13.60	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-80	1.00	22.00	19.50	16.50	322.79	144.54	9.59	2.40
BH-80	1.00	23.50	21.00	18.00	343.47	160.67	9.98	2.50
BH-80	1.00	25.00	22.50	19.50	364.15	176.79	10.36	2.59
BH-80	1.00	26.50	24.00	21.00	384.83	192.92	10.73	2.68
BH-80	1.00	28.00	25.50	22.50	405.51	209.05	11.10	2.77
BH-80	1.00	29.50	27.00	24.00	426.19	225.17	11.45	2.86
BH-80	1.00	30.00	27.50	24.50	433.09	230.55	11.45	2.86

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.10	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	12.83	25.65	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.45	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	38.74	51.83	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.45	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	64.91	78.00	4.71	13.40	73.77	87.16	34.87	11.45
4	7.00	8.50	1.50	Granular	19.40	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	92.55	107.10	4.71	19.10	99.49	131.99	52.79	18.44
5	8.50	10.00	1.50	Granular	19.40	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	121.65	136.20	4.71	27.11	177.00	236.60	94.64	27.68
6	10.00	11.50	1.50	Granular	19.40	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	150.75	165.30	4.71	33.60	212.56	305.76	122.30	38.74
7	11.50	13.00	1.50	Granular	19.40	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	179.85	194.40	4.71	40.08	248.12	381.41	152.56	51.61
8	13.00	14.50	1.50	Granular	9.59	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	201.60	208.79	4.71	44.93	260.37	438.59	175.43	65.84
9	14.50	16.00	1.50	Granular	9.59	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	208.79	208.79	4.71	48.26	299.14	525.61	210.24	81.00
10	16.00	17.50	1.50	Granular	9.59	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	208.79	208.79	4.71	48.26	299.14	573.86	229.55	96.16
11	17.50	19.00	1.50	Granular	9.59	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	208.79	208.79	4.71	51.70	376.68	703.10	281.24	112.29
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	208.79	208.79	4.71	51.70	377.14	755.27	302.11	128.42
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	208.79	208.79	4.71	51.70	377.14	806.97	322.79	144.54
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	208.79	208.79	4.71	51.70	377.14	858.67	343.47	160.67
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	208.79	208.79	4.71	51.70	377.14	910.37	364.15	176.79
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	208.79	208.79	4.71	51.70	377.14	962.08	384.83	192.92
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	208.79	208.79	4.71	51.70	377.14	1013.78	405.51	209.05
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	208.79	208.79	4.71	51.70	377.14	1065.48	426.19	225.17
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	208.79	208.79	1.57	17.23	377.14	1082.71	433.09	230.55

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.51	1.96	1.82	7.14	6.62	0.208	0.834	9.59	2.40	34.27	15.87	23.03	5.76	82.26	38.09
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
7	30.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-71	-
Chainage	7+629	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	110.92	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-71	1.00	22.00	19.50	16.50	170.84	86.65	12.15	3.04
BH-71	1.00	23.50	21.00	18.00	181.83	95.99	12.49	3.12
BH-71	1.00	25.00	22.50	19.50	192.81	105.33	12.82	3.21
BH-71	1.00	26.50	24.00	21.00	203.80	114.67	12.82	3.21
BH-71	1.00	28.00	25.50	22.50	214.79	124.01	13.16	3.29
BH-71	1.00	29.50	27.00	24.00	225.78	133.35	13.16	3.29
BH-71	1.00	30.00	27.50	24.50	229.44	136.47	13.48	3.37

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.29	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.41	21.88	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	9.59	0.03	23	-	6.00	8.68	1.00	-	6.25	7.00	29.08	36.27	4.71	5.52	27.10	32.62	13.05	9.24
4	7.00	8.50	1.50	Granular	9.59	0.03	23	-	6.00	8.68	1.00	-	7.75	8.50	43.47	50.66	4.71	8.25	36.95	50.72	20.29	13.20
5	8.50	10.00	1.50	Granular	9.59	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	57.86	65.05	4.71	12.42	72.14	98.33	39.33	18.33
6	10.00	11.50	1.50	Granular	10.19	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	72.70	80.34	4.71	15.60	88.32	130.11	52.04	24.35
7	11.50	13.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	87.99	95.63	4.71	21.06	158.79	221.64	88.66	31.89
8	13.00	14.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	103.28	110.92	4.71	24.72	183.05	270.62	108.25	40.46
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	110.92	110.92	4.71	26.55	183.05	297.17	118.87	49.55
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	110.92	110.92	4.71	26.55	183.05	323.72	129.49	58.63
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	110.92	110.92	4.71	27.47	204.03	372.17	148.87	67.97
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	110.92	110.92	4.71	27.47	204.03	399.64	159.85	77.31
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	110.92	110.92	4.71	27.47	204.03	427.10	170.84	86.65
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	110.92	110.92	4.71	27.47	204.03	454.57	181.83	95.99
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	110.92	110.92	4.71	27.47	204.03	482.04	192.81	105.33
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	110.92	110.92	4.71	27.47	204.03	509.50	203.80	114.67
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	110.92	110.92	4.71	27.47	204.03	536.97	214.79	124.01
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	110.92	110.92	4.71	27.47	204.03	564.44	225.78	133.35
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	110.92	110.92	1.57	9.16	204.03	573.59	229.44	136.47

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
2	22.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
3	24.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
4	25.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
5	27.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21
7	30.00	27	2.96E+07	4.91E-02	3.85E+03	3.28	1.68	1.95	1.81	6.38	5.94	0.148	0.593	13.48	3.37	42.99	20.00	32.35	8.09	103.19	48.01

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-71	-
Chainage	7+629	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	141.50	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-71	1.20	22.00	19.50	16.50	271.07	119.88	15.78	3.95
BH-71	1.20	23.50	21.00	18.00	287.89	134.03	16.23	4.06
BH-71	1.20	25.00	22.50	19.50	304.71	148.18	16.66	4.17
BH-71	1.20	26.50	24.00	21.00	321.53	162.32	16.66	4.17
BH-71	1.20	28.00	25.50	22.50	338.35	176.47	17.09	4.27
BH-71	1.20	29.50	27.00	24.00	355.17	190.62	17.09	4.27
BH-71	1.20	30.00	27.50	24.50	360.77	195.34	17.51	4.38

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.29	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.41	21.88	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	9.59	0.03	23	-	6.00	8.68	1.00	-	6.25	7.00	29.08	36.27	5.65	6.62	39.67	46.29	18.52	12.94
4	7.00	8.50	1.50	Granular	9.59	0.03	23	-	6.00	8.68	1.00	-	7.75	8.50	43.47	50.66	5.65	9.90	53.85	70.38	28.15	18.09
5	8.50	10.00	1.50	Granular	9.59	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	57.86	65.05	5.65	14.90	105.18	136.60	54.64	24.63
6	10.00	11.50	1.50	Granular	10.19	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	72.70	80.34	5.65	18.72	128.56	178.71	71.48	32.25
7	11.50	13.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	87.99	95.63	5.65	25.27	230.70	306.12	122.45	41.70
8	13.00	14.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	103.28	110.92	5.65	29.67	265.63	370.71	148.29	52.38
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	118.57	126.21	5.65	34.06	300.56	439.70	175.88	64.29
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	133.86	141.50	5.65	38.45	335.49	513.09	205.23	77.44
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	141.50	141.50	5.65	42.05	373.94	593.58	237.43	91.58
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	141.50	141.50	5.65	42.05	373.94	635.63	254.25	105.73
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	141.50	141.50	5.65	42.05	373.94	677.68	271.07	119.88
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	141.50	141.50	5.65	42.05	373.94	719.73	287.89	134.03
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	141.50	141.50	5.65	42.05	373.94	761.77	304.71	148.18
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	141.50	141.50	5.65	42.05	373.94	803.82	321.53	162.32
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	141.50	141.50	5.65	42.05	373.94	845.87	338.35	176.47
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	141.50	141.50	5.65	42.05	373.94	887.92	355.17	190.62
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	141.50	141.50	1.88	14.02	373.94	901.93	360.77	195.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
2	22.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
3	24.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
4	25.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
5	27.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22
7	30.00	27	2.96E+07	1.02E-01	3.85E+03	3.79	1.45	1.97	1.82	7.45	6.89	0.114	0.457	17.51	4.38	65.28	30.17	42.03	10.51	156.67	72.42

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-72	-
Chainage	7+728	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.85	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-72	1.00	22.00	19.50	16.50	144.49	79.45	12.15	3.04
BH-72	1.00	23.50	21.00	18.00	153.79	87.72	12.49	3.12
BH-72	1.00	25.00	22.50	19.50	163.26	95.99	12.49	3.12
BH-72	1.00	26.50	24.00	21.00	180.72	104.50	12.49	3.12
BH-72	1.00	28.00	25.50	22.50	190.51	113.00	12.82	3.21
BH-72	1.00	29.50	27.00	24.00	200.31	121.50	12.82	3.21
BH-72	1.00	30.00	27.50	24.50	203.57	124.34	13.16	3.29

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	16.67	22.41	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	28.14	33.87	4.71	6.27	45.55	51.82	20.73	9.45
4	7.00	8.50	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	39.60	45.34	4.71	8.83	59.56	74.66	29.86	13.57
5	8.50	10.00	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	51.07	56.80	4.71	11.38	73.57	100.05	40.02	18.41
6	10.00	11.50	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	62.53	68.27	4.71	13.94	87.58	128.00	51.20	23.96
7	11.50	13.00	1.50	Granular	10.19	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	75.91	83.56	4.71	17.54	123.64	181.60	72.64	30.52
8	13.00	14.50	1.50	Granular	10.19	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	91.20	98.85	4.71	21.08	145.12	224.15	89.66	38.07
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	98.85	98.85	4.71	23.66	163.89	266.59	106.64	46.35
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	98.85	98.85	4.71	23.66	163.89	290.25	116.10	54.62
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	98.85	98.85	4.71	23.66	163.89	313.91	125.56	62.90
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	98.85	98.85	4.71	23.66	163.89	337.57	135.03	71.17
13	20.50	22.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	98.85	98.85	4.71	23.66	163.89	361.23	144.49	79.45
14	22.00	23.50	1.50	Granular	9.59	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	98.85	98.85	4.71	23.66	163.48	384.48	153.79	87.72
15	23.50	25.00	1.50	Granular	9.59	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	98.85	98.85	4.71	23.66	163.48	408.14	163.26	95.99
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	98.85	98.85	4.71	24.48	182.67	451.81	180.72	104.50
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	98.85	98.85	4.71	24.48	182.67	476.29	190.51	113.00
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	98.85	98.85	4.71	24.48	182.67	500.76	200.31	121.50
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	98.85	98.85	1.57	8.16	182.67	508.92	203.57	124.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.63	1.95	1.81	6.60	6.14	0.165	0.658	12.15	3.04	40.12	18.64	29.16	7.29	96.28	44.73
2	22.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
4	25.50	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.64	1.95	1.81	6.54	6.08	0.160	0.641	12.49	3.12	40.86	18.99	29.98	7.49	98.07	45.58
5	27.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
6	28.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.65	1.95	1.81	6.49	6.03	0.156	0.624	12.82	3.21	41.59	19.34	30.78	7.69	99.81	46.41
7	30.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.30	19.67	31.57	7.89	101.52	47.21

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-72	-
Chainage	7+728	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	129.43	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-72	1.20	22.00	19.50	16.50	231.94	110.98	15.78	3.95
BH-72	1.20	23.50	21.00	18.00	246.52	123.76	16.23	4.06
BH-72	1.20	25.00	22.50	19.50	261.39	136.55	16.23	4.06
BH-72	1.20	26.50	24.00	21.00	291.18	149.69	16.23	4.06
BH-72	1.20	28.00	25.50	22.50	306.56	162.84	16.66	4.17
BH-72	1.20	29.50	27.00	24.00	321.95	175.98	16.66	4.17
BH-72	1.20	30.00	27.50	24.50	327.07	180.36	17.09	4.27

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	16.67	22.41	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	28.14	33.87	5.65	7.53	66.79	74.31	29.72	13.19
4	7.00	8.50	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	39.60	45.34	5.65	10.59	86.96	105.08	42.03	18.53
5	8.50	10.00	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	51.07	56.80	5.65	13.66	107.14	138.91	55.56	24.73
6	10.00	11.50	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	62.53	68.27	5.65	16.72	127.31	175.81	70.32	31.79
7	11.50	13.00	1.50	Granular	10.19	0.08	28	-	15.70	17.82	1.00	-	12.25	13.00	75.91	83.56	5.65	21.05	179.86	249.41	99.77	40.06
8	13.00	14.50	1.50	Granular	10.19	0.08	28	-	15.70	17.82	1.00	-	13.75	14.50	91.20	98.85	5.65	25.29	210.78	305.63	122.25	49.52
9	14.50	16.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	106.49	114.14	5.65	30.59	272.97	398.41	159.36	60.46
10	16.00	17.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	121.78	129.43	5.65	34.98	307.91	468.32	187.33	72.63
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	129.43	129.43	5.65	37.18	307.91	505.50	202.20	85.41
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	129.43	129.43	5.65	37.18	307.91	542.67	217.07	98.19
13	20.50	22.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	21.25	22.00	129.43	129.43	5.65	37.18	307.91	579.85	231.94	110.98
14	22.00	23.50	1.50	Granular	9.59	0.03	29	-	17.60	20.13	1.00	-	22.75	23.50	129.43	129.43	5.65	37.18	307.19	616.31	246.52	123.76
15	23.50	25.00	1.50	Granular	9.59	0.03	29	-	17.60	20.13	1.00	-	24.25	25.00	129.43	129.43	5.65	37.18	307.19	653.49	261.39	136.55
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	129.43	129.43	5.65	38.46	343.19	727.95	291.18	149.69
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	129.43	129.43	5.65	38.46	343.19	766.41	306.56	162.84
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	129.43	129.43	5.65	38.46	343.19	804.87	321.95	175.98
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	129.43	129.43	1.88	12.82	343.19	817.69	327.07	180.36

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.12	0.127	0.507	15.78	3.95	60.91	28.11	37.88	9.47	146.17	67.47
2	22.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
4	25.50	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.493	16.23	4.06	62.04	28.65	38.94	9.74	148.89	68.75
5	27.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
6	28.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.480	16.66	4.17	63.14	29.17	39.99	10.00	151.54	70.00
7	30.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.44	1.97	1.82	7.52	6.95	0.117	0.468	17.09	4.27	64.22	29.68	41.02	10.25	154.13	71.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-73	-
Chainage	7+837	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	97.65	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-73	1.00	22.00	19.50	16.50	151.04	79.36	10.73	2.68
BH-73	1.00	23.50	21.00	18.00	160.71	87.78	11.10	2.77
BH-73	1.00	25.00	22.50	19.50	170.38	96.20	11.10	2.77
BH-73	1.00	26.50	24.00	21.00	179.90	104.62	11.10	2.77
BH-73	1.00	28.00	25.50	22.50	189.57	113.04	11.10	2.77
BH-73	1.00	29.50	27.00	24.00	199.24	121.46	11.10	2.77
BH-73	1.00	30.00	27.50	24.50	202.47	124.27	11.10	2.77

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	16.41	21.88	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.64	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	27.61	33.35	4.71	5.47	28.12	33.59	13.44	9.23
4	7.00	8.50	1.50	Granular	7.64	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	39.08	44.81	4.71	7.74	36.96	50.17	20.07	13.05
5	8.50	10.00	1.50	Granular	7.64	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	50.54	56.28	4.71	10.85	62.10	86.16	34.46	17.73
6	10.00	11.50	1.50	Granular	9.19	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	63.17	70.07	4.71	13.56	77.17	114.78	45.91	23.18
7	11.50	13.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	76.96	83.86	4.71	18.42	139.42	195.45	78.18	29.98
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	90.75	97.65	4.71	21.72	161.29	239.06	95.62	37.72
9	14.50	16.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	97.65	97.65	4.71	23.37	161.99	263.12	105.25	45.91
10	16.00	17.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	97.65	97.65	4.71	23.37	161.99	286.50	114.60	54.10
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	97.65	97.65	4.71	24.18	180.55	329.23	131.69	62.52
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	97.65	97.65	4.71	24.18	180.55	353.41	141.37	70.94
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	97.65	97.65	4.71	24.18	180.55	377.59	151.04	79.36
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	97.65	97.65	4.71	24.18	180.55	401.77	160.71	87.78
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	97.65	97.65	4.71	24.18	180.55	425.95	170.38	96.20
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	97.65	97.65	4.71	24.18	180.16	449.75	179.90	104.62
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	97.65	97.65	4.71	24.18	180.16	473.93	189.57	113.04
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	97.65	97.65	4.71	24.18	180.16	498.11	199.24	121.46
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	97.65	97.65	1.57	8.06	180.16	506.17	202.47	124.27

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
2	22.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
3	24.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
6	28.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
7	30.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-73	-
Chainage	7+837	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	128.23	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-73	1.20	22.00	19.50	16.50	245.05	111.13	13.94	3.49
BH-73	1.20	23.50	21.00	18.00	260.29	124.18	14.41	3.60
BH-73	1.20	25.00	22.50	19.50	275.54	137.22	14.41	3.60
BH-73	1.20	26.50	24.00	21.00	290.51	150.27	14.41	3.60
BH-73	1.20	28.00	25.50	22.50	305.75	163.31	14.41	3.60
BH-73	1.20	29.50	27.00	24.00	320.99	176.35	14.41	3.60
BH-73	1.20	30.00	27.50	24.50	326.07	180.70	14.41	3.60

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	16.41	21.88	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.64	0.07	24	-	8.00	9.78	1.00	-	6.25	7.00	27.61	33.35	5.65	6.56	41.19	47.75	19.10	12.92
4	7.00	8.50	1.50	Granular	7.64	0.07	24	-	8.00	9.78	1.00	-	7.75	8.50	39.08	44.81	5.65	9.29	53.92	69.77	27.91	17.90
5	8.50	10.00	1.50	Granular	7.64	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	50.54	56.28	5.65	13.02	90.46	119.33	47.73	23.92
6	10.00	11.50	1.50	Granular	9.19	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	63.17	70.07	5.65	16.27	112.36	157.50	63.00	30.85
7	11.50	13.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	76.96	83.86	5.65	22.11	202.60	269.84	107.94	39.41
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	90.75	97.65	5.65	26.07	234.10	327.41	130.97	49.09
9	14.50	16.00	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	105.29	112.94	5.65	30.24	270.23	393.79	157.52	59.93
10	16.00	17.50	1.50	Granular	10.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	120.58	128.23	5.65	34.64	305.16	463.36	185.34	72.00
11	17.50	19.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	128.23	128.23	5.65	38.10	340.13	536.43	214.57	85.05
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	128.23	128.23	5.65	38.10	340.13	574.53	229.81	98.09
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	128.23	128.23	5.65	38.10	340.13	612.63	245.05	111.13
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	128.23	128.23	5.65	38.10	340.13	650.74	260.29	124.18
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	128.23	128.23	5.65	38.10	340.13	688.84	275.54	137.22
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	128.23	128.23	5.65	38.10	339.47	726.28	290.51	150.27
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	128.23	128.23	5.65	38.10	339.47	764.38	305.75	163.31
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	128.23	128.23	5.65	38.10	339.47	802.48	320.99	176.35
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	128.23	128.23	1.88	12.70	339.47	815.18	326.07	180.70

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
2	22.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
3	24.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
6	28.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
7	30.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-74	-
Chainage	7+912	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-74	1.00	22.00	19.50	18.00	162.01	83.74	11.06	2.77
BH-74	1.00	23.50	21.00	19.50	172.34	92.62	11.38	2.85
BH-74	1.00	25.00	22.50	21.00	182.68	101.50	11.70	2.93
BH-74	1.00	26.50	24.00	22.50	193.01	110.39	12.01	3.00
BH-74	1.00	28.00	25.50	24.00	203.34	119.27	12.01	3.00
BH-74	1.00	29.50	27.00	25.50	213.68	128.15	12.32	3.08
BH-74	1.00	30.00	27.50	26.00	217.12	131.11	12.32	3.08

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	5.73	11.47	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	17.20	22.93	4.71	3.26	17.50	20.77	8.31	6.96
3	5.50	7.00	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	28.66	34.40	4.71	6.39	46.19	55.84	22.34	10.40
4	7.00	8.50	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	40.13	45.86	4.71	8.94	60.20	78.80	31.52	14.55
5	8.50	10.00	1.50	Granular	9.59	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	53.06	60.25	4.71	11.82	78.85	109.27	43.71	19.51
6	10.00	11.50	1.50	Granular	9.59	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	67.45	74.64	4.71	15.03	96.43	141.88	56.75	25.37
7	11.50	13.00	1.50	Granular	9.59	0.11	27	-	13.80	15.50	1.00	-	12.25	13.00	81.84	89.03	4.71	18.24	114.02	177.71	71.08	32.13
8	13.00	14.50	1.50	Granular	10.19	0.11	27	-	13.80	15.50	1.00	-	13.75	14.50	96.68	104.32	4.71	21.55	133.03	218.27	87.31	39.81
9	14.50	16.00	1.50	Granular	10.19	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	104.32	104.32	4.71	24.97	172.58	282.79	113.11	48.45
10	16.00	17.50	1.50	Granular	10.19	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	104.32	104.32	4.71	24.97	172.58	307.76	123.10	57.09
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	104.32	104.32	4.71	25.83	192.35	353.36	141.35	65.97
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	104.32	104.32	4.71	25.83	192.35	379.20	151.68	74.86
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	104.32	104.32	4.71	25.83	192.35	405.03	162.01	83.74
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	104.32	104.32	4.71	25.83	192.35	430.86	172.34	92.62
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	104.32	104.32	4.71	25.83	192.35	456.69	182.68	101.50
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	104.32	104.32	4.71	25.83	192.35	482.53	193.01	110.39
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	104.32	104.32	4.71	25.83	192.35	508.36	203.34	119.27
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	104.32	104.32	4.71	25.83	192.35	534.19	213.68	128.15
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	104.32	104.32	1.57	8.61	192.35	542.80	217.12	131.11

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.77	37.68	17.25	26.54	6.64	90.43	41.41
2	22.50	23	2.96E+07	4.91E-02	3.27E+03	3.38	1.18	1.99	1.83	6.75	6.18	0.176	0.703	11.38	2.85	38.41	17.59	27.32	6.83	92.19	42.23
3	24.00	24	2.96E+07	4.91E-02	3.42E+03	3.35	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.70	2.93	39.12	17.93	28.08	7.02	93.90	43.03
4	25.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
5	27.00	25	2.96E+07	4.91E-02	3.56E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.166	0.666	12.01	3.00	39.82	18.25	28.84	7.21	95.57	43.81
6	28.50	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57
7	30.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.649	12.32	3.08	40.50	18.57	29.58	7.39	97.20	44.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-74	-
Chainage	7+912	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	134.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-74	1.20	22.00	19.50	18.00	259.36	116.39	14.39	3.60
BH-74	1.20	23.50	21.00	19.50	275.39	129.98	14.81	3.70
BH-74	1.20	25.00	22.50	21.00	291.42	143.58	15.22	3.81
BH-74	1.20	26.50	24.00	22.50	307.46	157.18	15.63	3.91
BH-74	1.20	28.00	25.50	24.00	323.49	170.78	15.63	3.91
BH-74	1.20	29.50	27.00	25.50	339.53	184.38	16.03	4.01
BH-74	1.20	30.00	27.50	26.00	344.87	188.91	16.03	4.01

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	5.73	11.47	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	17.20	22.93	5.65	3.92	25.72	29.64	11.86	9.81
3	5.50	7.00	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	28.66	34.40	5.65	7.67	67.71	79.29	31.72	14.33
4	7.00	8.50	1.50	Granular	7.64	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	40.13	45.86	5.65	10.73	87.89	110.20	44.08	19.71
5	8.50	10.00	1.50	Granular	9.59	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	53.06	60.25	5.65	14.19	115.04	151.55	60.62	26.05
6	10.00	11.50	1.50	Granular	9.59	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	67.45	74.64	5.65	18.04	140.37	194.91	77.96	33.48
7	11.50	13.00	1.50	Granular	9.59	0.11	27	-	13.80	15.50	1.00	-	12.25	13.00	81.84	89.03	5.65	21.89	165.69	242.12	96.85	41.98
8	13.00	14.50	1.50	Granular	10.19	0.11	27	-	13.80	15.50	1.00	-	13.75	14.50	96.68	104.32	5.65	25.85	193.16	295.44	118.18	51.60
9	14.50	16.00	1.50	Granular	10.19	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	111.97	119.61	5.65	32.16	285.48	419.93	167.97	62.98
10	16.00	17.50	1.50	Granular	10.19	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	127.26	134.90	5.65	36.55	320.41	491.41	196.56	75.59
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	134.90	134.90	5.65	40.09	357.13	568.22	227.29	89.19
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	134.90	134.90	5.65	40.09	357.13	608.30	243.32	102.79
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	134.90	134.90	5.65	40.09	357.13	648.39	259.36	116.39
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	134.90	134.90	5.65	40.09	357.13	688.48	275.39	129.98
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	134.90	134.90	5.65	40.09	357.13	728.56	291.42	143.58
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	134.90	134.90	5.65	40.09	357.13	768.65	307.46	157.18
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	134.90	134.90	5.65	40.09	357.13	808.73	323.49	170.78
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	134.90	134.90	5.65	40.09	357.13	848.82	339.53	184.38
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	134.90	134.90	1.88	13.36	357.13	862.18	344.87	188.91

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.64	137.45	62.55
2	22.50	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.02	2.01	1.83	7.88	7.18	0.135	0.540	14.81	3.70	58.38	26.57	35.55	8.89	140.11	63.78
3	24.00	24	2.96E+07	1.02E-01	3.42E+03	3.88	1.03	2.01	1.83	7.81	7.11	0.131	0.525	15.22	3.81	59.46	27.08	36.54	9.13	142.70	64.98
4	25.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
5	27.00	25	2.96E+07	1.02E-01	3.56E+03	3.85	1.04	2.01	1.83	7.74	7.05	0.128	0.512	15.63	3.91	60.51	27.56	37.51	9.38	145.23	66.16
6	28.50	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30
7	30.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.03	4.01	61.54	28.04	38.48	9.62	147.70	67.30

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-75	-
Chainage	8+031	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	90.67	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-75	1.00	22.00	19.50	15.00	133.42	70.59	9.66	2.41
BH-75	1.00	23.50	21.00	16.50	142.40	78.53	9.66	2.41
BH-75	1.00	25.00	22.50	18.00	151.38	86.46	9.66	2.41
BH-75	1.00	26.50	24.00	19.50	160.36	94.40	10.07	2.52
BH-75	1.00	28.00	25.50	21.00	169.34	102.33	10.07	2.52
BH-75	1.00	29.50	27.00	22.50	178.32	110.27	10.07	2.52
BH-75	1.00	30.00	27.50	23.00	181.31	112.92	10.07	2.52

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	5.47	10.94	4.71	1.04	0.00	1.04	0.42	4.69
2	4.00	5.50	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	16.41	21.88	4.71	3.12	0.00	4.15	1.66	7.21
3	5.50	7.00	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	6.25	7.00	27.61	33.35	4.71	5.24	0.00	9.40	3.76	10.33
4	7.00	8.50	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	7.75	8.50	39.08	44.81	4.71	7.42	32.48	49.29	19.72	14.05
5	8.50	10.00	1.50	Granular	7.64	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	50.54	56.28	4.71	10.43	51.27	78.52	31.41	18.62
6	10.00	11.50	1.50	Granular	7.64	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	62.01	67.74	4.71	12.80	61.11	101.15	40.46	23.86
7	11.50	13.00	1.50	Granular	7.64	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	73.47	79.21	4.71	16.98	115.96	172.98	69.19	30.26
8	13.00	14.50	1.50	Granular	7.64	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	84.94	90.67	4.71	19.63	132.06	208.71	83.48	37.41
9	14.50	16.00	1.50	Granular	7.64	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	90.67	90.67	4.71	0.00	149.15	225.81	90.32	39.06
10	16.00	17.50	1.50	Granular	7.64	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	90.67	90.67	4.71	21.70	149.15	247.51	99.00	46.78
11	17.50	19.00	1.50	Granular	7.64	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	90.67	90.67	4.71	22.45	166.25	287.06	114.82	54.72
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	90.67	90.67	4.71	22.45	167.83	311.09	124.43	62.65
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	90.67	90.67	4.71	22.45	167.83	333.54	133.42	70.59
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	90.67	90.67	4.71	22.45	167.83	355.99	142.40	78.53
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	90.67	90.67	4.71	22.45	167.83	378.44	151.38	86.46
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	90.67	90.67	4.71	22.45	167.83	400.90	160.36	94.40
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	90.67	90.67	4.71	22.45	167.83	423.35	169.34	102.33
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	90.67	90.67	4.71	22.45	167.83	445.80	178.32	110.27
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	90.67	90.67	1.57	7.48	167.83	453.29	181.31	112.92

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	4.91E-02	2.12E+03	3.69	1.90	1.93	1.81	7.13	6.67	0.207	0.828	9.66	2.41	34.43	16.10	23.18	5.80	82.63	38.64
2	22.50	15	2.96E+07	4.91E-02	2.12E+03	3.69	1.90	1.93	1.81	7.13	6.67	0.207	0.828	9.66	2.41	34.43	16.10	23.18	5.80	82.63	38.64
3	24.00	15	2.96E+07	4.91E-02	2.12E+03	3.69	1.90	1.93	1.81	7.13	6.67	0.207	0.828	9.66	2.41	34.43	16.10	23.18	5.80	82.63	38.64
4	25.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76
5	27.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76
6	28.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76
7	30.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.92	1.93	1.81	7.03	6.58	0.199	0.794	10.07	2.52	35.41	16.57	24.18	6.04	84.97	39.76

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-75	-
Chainage	8+031	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	113.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-75	1.20	22.00	19.50	15.00	210.58	97.62	12.56	3.14
BH-75	1.20	23.50	21.00	16.50	224.08	109.45	12.56	3.14
BH-75	1.20	25.00	22.50	18.00	237.59	121.27	12.56	3.14
BH-75	1.20	26.50	24.00	19.50	251.09	133.10	13.10	3.27
BH-75	1.20	28.00	25.50	21.00	264.59	144.93	13.10	3.27
BH-75	1.20	29.50	27.00	22.50	278.10	156.76	13.10	3.27
BH-75	1.20	30.00	27.50	23.00	282.60	160.70	13.10	3.27

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	5.47	10.94	5.65	1.25	0.00	1.25	0.50	6.68
2	4.00	5.50	1.50	Granular	7.29	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	16.41	21.88	5.65	3.74	0.00	4.98	1.99	10.10
3	5.50	7.00	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	6.25	7.00	27.61	33.35	5.65	6.29	0.00	11.28	4.51	14.24
4	7.00	8.50	1.50	Granular	7.64	0.03	23	-	6.00	8.68	1.00	-	7.75	8.50	39.08	44.81	5.65	8.90	47.29	67.47	26.99	19.11
5	8.50	10.00	1.50	Granular	7.64	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	50.54	56.28	5.65	12.52	74.70	107.39	42.96	24.99
6	10.00	11.50	1.50	Granular	7.64	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	62.01	67.74	5.65	15.35	88.86	136.91	54.76	31.66
7	11.50	13.00	1.50	Granular	7.64	0.02	28	-	15.70	17.82	1.00	-	12.25	13.00	73.47	79.21	5.65	20.38	168.34	236.77	94.71	39.74
8	13.00	14.50	1.50	Granular	7.64	0.02	28	-	15.70	17.82	1.00	-	13.75	14.50	84.94	90.67	5.65	23.56	191.53	283.51	113.40	48.71
9	14.50	16.00	1.50	Granular	7.64	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	96.40	102.14	5.65	0.00	242.50	334.48	133.79	51.09
10	16.00	17.50	1.50	Granular	7.64	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	107.87	113.60	5.65	30.98	268.69	391.66	156.66	62.14
11	17.50	19.00	1.50	Granular	7.64	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	113.60	113.60	5.65	33.76	299.49	456.22	182.49	73.97
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	113.60	113.60	5.65	33.76	302.22	492.70	197.08	85.79
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	113.60	113.60	5.65	33.76	302.22	526.46	210.58	97.62
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	113.60	113.60	5.65	33.76	302.22	560.21	224.08	109.45
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	113.60	113.60	5.65	33.76	302.22	593.97	237.59	121.27
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	113.60	113.60	5.65	33.76	302.22	627.73	251.09	133.10
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	113.60	113.60	5.65	33.76	302.22	661.48	264.59	144.93
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	113.60	113.60	5.65	33.76	302.22	695.24	278.10	156.76
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	113.60	113.60	1.88	11.25	302.22	706.49	282.60	160.70

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	1.02E-01	2.12E+03	4.27	1.64	1.95	1.81	8.33	7.74	0.159	0.637	12.56	3.14	52.30	24.30	30.14	7.54	125.51	58.33
2	22.50	15	2.96E+07	1.02E-01	2.12E+03	4.27	1.64	1.95	1.81	8.33	7.74	0.159	0.637	12.56	3.14	52.30	24.30	30.14	7.54	125.51	58.33
3	24.00	15	2.96E+07	1.02E-01	2.12E+03	4.27	1.64	1.95	1.81	8.33	7.74	0.159	0.637	12.56	3.14	52.30	24.30	30.14	7.54	125.51	58.33
4	25.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03
5	27.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03
6	28.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03
7	30.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.66	1.95	1.81	8.21	7.64	0.153	0.611	13.10	3.27	53.79	25.01	31.44	7.86	129.09	60.03

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-76	-
Chainage	8+069	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	91.95	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-76	1.00	22.00	19.50	16.50	143.25	76.73	9.98	2.50
BH-76	1.00	23.50	21.00	18.00	152.36	84.76	10.36	2.59
BH-76	1.00	25.00	22.50	19.50	161.46	92.78	10.73	2.68
BH-76	1.00	26.50	24.00	21.00	170.57	100.81	11.10	2.77
BH-76	1.00	28.00	25.50	22.50	179.68	108.83	11.45	2.86
BH-76	1.00	29.50	27.00	24.00	188.79	116.86	11.80	2.95
BH-76	1.00	30.00	27.50	24.50	191.82	119.53	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.64	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.67	22.41	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.64	0.04	27	-	13.80	15.50	1.00	-	6.25	7.00	28.14	33.87	4.71	6.27	45.55	51.82	20.73	9.45
4	7.00	8.50	1.50	Granular	7.64	0.04	27	-	13.80	15.50	1.00	-	7.75	8.50	39.60	45.34	4.71	8.83	59.56	74.66	29.86	13.57
5	8.50	10.00	1.50	Granular	7.29	0.04	27	-	13.80	15.50	1.00	-	9.25	10.00	50.81	56.28	4.71	11.32	72.74	99.16	39.66	18.39
6	10.00	11.50	1.50	Granular	7.29	0.04	27	-	13.80	15.50	1.00	-	10.75	11.50	61.75	67.22	4.71	13.76	86.11	126.29	50.52	23.90
7	11.50	13.00	1.50	Granular	7.29	0.05	27	-	13.80	15.50	1.00	-	12.25	13.00	72.69	78.16	4.71	16.20	99.48	155.86	62.34	30.08
8	13.00	14.50	1.50	Granular	9.19	0.05	27	-	13.80	15.50	1.00	-	13.75	14.50	85.05	91.95	4.71	18.95	117.36	192.70	77.08	37.04
9	14.50	16.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	91.95	91.95	4.71	22.01	152.25	249.60	99.84	44.85
10	16.00	17.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	91.95	91.95	4.71	22.01	152.25	271.60	108.64	52.66
11	17.50	19.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	91.95	91.95	4.71	22.77	170.46	312.59	125.03	60.69
12	19.00	20.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	91.95	91.95	4.71	22.77	170.46	335.35	134.14	68.71
13	20.50	22.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	91.95	91.95	4.71	22.77	170.46	358.12	143.25	76.73
14	22.00	23.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	91.95	91.95	4.71	22.77	170.46	380.89	152.36	84.76
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	91.95	91.95	4.71	22.77	170.46	403.66	161.46	92.78
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	91.95	91.95	4.71	22.77	170.46	426.43	170.57	100.81
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	91.95	91.95	4.71	22.77	170.46	449.20	179.68	108.83
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	91.95	91.95	4.71	22.77	170.46	471.96	188.79	116.86
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	91.95	91.95	1.57	7.59	170.46	479.55	191.82	119.53

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
2	22.50	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
3	24.00	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
5	27.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
6	28.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.28	28.33	7.08	94.45	43.86

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-76	-
Chainage	8+069	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	119.53	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-76	1.20	22.00	19.50	16.50	230.27	106.99	12.97	3.24
BH-76	1.20	23.50	21.00	18.00	244.48	119.31	13.46	3.36
BH-76	1.20	25.00	22.50	19.50	258.68	131.63	13.94	3.49
BH-76	1.20	26.50	24.00	21.00	272.89	143.95	14.41	3.60
BH-76	1.20	28.00	25.50	22.50	287.10	156.27	14.88	3.72
BH-76	1.20	29.50	27.00	24.00	301.30	168.59	15.33	3.83
BH-76	1.20	30.00	27.50	24.50	306.04	172.70	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.64	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.67	22.41	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.64	0.04	27	-	13.80	15.50	1.00	-	6.25	7.00	28.14	33.87	5.65	7.53	66.79	74.31	29.72	13.19
4	7.00	8.50	1.50	Granular	7.64	0.04	27	-	13.80	15.50	1.00	-	7.75	8.50	39.60	45.34	5.65	10.59	86.96	105.08	42.03	18.53
5	8.50	10.00	1.50	Granular	7.29	0.04	27	-	13.80	15.50	1.00	-	9.25	10.00	50.81	56.28	5.65	13.59	105.89	137.59	55.04	24.71
6	10.00	11.50	1.50	Granular	7.29	0.04	27	-	13.80	15.50	1.00	-	10.75	11.50	61.75	67.22	5.65	16.51	125.14	173.35	69.34	31.71
7	11.50	13.00	1.50	Granular	7.29	0.05	27	-	13.80	15.50	1.00	-	12.25	13.00	72.69	78.16	5.65	19.44	144.39	212.05	84.82	39.53
8	13.00	14.50	1.50	Granular	9.19	0.05	27	-	13.80	15.50	1.00	-	13.75	14.50	85.05	91.95	5.65	22.75	170.44	260.84	104.34	48.27
9	14.50	16.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	98.84	105.74	5.65	28.39	252.58	371.38	148.55	58.60
10	16.00	17.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	112.63	119.53	5.65	32.35	284.09	435.23	174.09	70.03
11	17.50	19.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	119.53	119.53	5.65	35.52	317.97	504.64	201.85	82.35
12	19.00	20.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	119.53	119.53	5.65	35.52	317.97	540.15	216.06	94.67
13	20.50	22.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	119.53	119.53	5.65	35.52	317.97	575.67	230.27	106.99
14	22.00	23.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	119.53	119.53	5.65	35.52	317.97	611.19	244.48	119.31
15	23.50	25.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	119.53	119.53	5.65	35.52	317.97	646.71	258.68	131.63
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	119.53	119.53	5.65	35.52	317.97	682.22	272.89	143.95
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	119.53	119.53	5.65	35.52	317.97	717.74	287.10	156.27
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	119.53	119.53	5.65	35.52	317.97	753.26	301.30	168.59
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	119.53	119.53	1.88	11.84	317.97	765.10	306.04	172.70

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
2	22.50	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
3	24.00	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
5	27.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
6	28.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.75	27.57	36.80	9.20	143.39	66.16

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-77	-
Chainage	8+226	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	91.38	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-77	1.00	22.00	19.50	19.50	140.51	75.32	7.60	1.90
BH-77	1.00	23.50	21.00	21.00	149.56	83.30	7.95	1.99
BH-77	1.00	25.00	22.50	22.50	158.62	91.29	7.95	1.99
BH-77	1.00	26.50	24.00	24.00	167.97	99.27	7.95	1.99
BH-77	1.00	28.00	25.50	25.50	177.02	107.26	8.28	2.07
BH-77	1.00	29.50	27.00	27.00	186.08	115.24	8.28	2.07
BH-77	1.00	30.00	27.50	27.50	189.09	117.90	8.61	2.15

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.05	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	6.04	12.08	4.71	1.15	10.17	11.32	4.53	4.72
2	4.00	5.50	1.50	Granular	8.05	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	18.12	24.16	4.71	0.00	18.44	19.59	7.84	6.37
3	5.50	7.00	1.50	Granular	7.29	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	29.63	35.10	4.71	0.00	32.98	34.12	13.65	8.02
4	7.00	8.50	1.50	Granular	7.29	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	40.57	46.04	4.71	8.37	42.36	51.88	20.75	12.01
5	8.50	10.00	1.50	Granular	7.29	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	51.51	56.98	4.71	11.05	62.67	83.24	33.30	16.76
6	10.00	11.50	1.50	Granular	7.64	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	62.71	68.45	4.71	13.46	74.76	108.79	43.52	22.17
7	11.50	13.00	1.50	Granular	7.64	0.06	28	-	15.70	17.82	1.00	-	12.25	13.00	74.18	79.91	4.71	17.14	116.95	168.12	67.25	28.62
8	13.00	14.50	1.50	Granular	7.64	0.06	28	-	15.70	17.82	1.00	-	13.75	14.50	85.64	91.38	4.71	19.79	133.05	204.02	81.61	35.82
9	14.50	16.00	1.50	Granular	7.64	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	91.38	91.38	4.71	21.87	150.27	243.11	97.25	43.59
10	16.00	17.50	1.50	Granular	7.64	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	91.38	91.38	4.71	21.87	150.27	264.99	106.00	51.36
11	17.50	19.00	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	91.38	91.38	4.71	22.63	168.69	306.03	122.41	59.35
12	19.00	20.50	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	91.38	91.38	4.71	22.63	168.69	328.66	131.46	67.33
13	20.50	22.00	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	21.25	22.00	91.38	91.38	4.71	22.63	168.69	351.28	140.51	75.32
14	22.00	23.50	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	22.75	23.50	91.38	91.38	4.71	22.63	168.69	373.91	149.56	83.30
15	23.50	25.00	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	24.25	25.00	91.38	91.38	4.71	22.63	168.69	396.54	158.62	91.29
16	25.00	26.50	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	25.75	26.50	91.38	91.38	4.71	22.63	169.46	419.93	167.97	99.27
17	26.50	28.00	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	27.25	28.00	91.38	91.38	4.71	22.63	169.46	442.56	177.02	107.26
18	28.00	29.50	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	28.75	29.50	91.38	91.38	4.71	22.63	169.46	465.19	186.08	115.24
19	29.50	30.00	0.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	29.75	30.00	91.38	91.38	1.57	7.54	169.46	472.73	189.09	117.90

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	14	2.96E+07	4.91E-02	1.98E+03	3.74	0.67	2.06	1.85	7.72	6.92	0.263	1.052	7.60	1.90	29.35	13.15	18.24	4.56	70.43	31.55
2	22.50	15	2.96E+07	4.91E-02	2.12E+03	3.69	0.68	2.06	1.85	7.61	6.82	0.252	1.007	7.95	1.99	30.23	13.55	19.07	4.77	72.55	32.51
3	24.00	15	2.96E+07	4.91E-02	2.12E+03	3.69	0.68	2.06	1.85	7.61	6.82	0.252	1.007	7.95	1.99	30.23	13.55	19.07	4.77	72.55	32.51
4	25.50	15	2.96E+07	4.91E-02	2.12E+03	3.69	0.68	2.06	1.85	7.61	6.82	0.252	1.007	7.95	1.99	30.23	13.55	19.07	4.77	72.55	32.51
5	27.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
6	28.50	16	2.96E+07	4.91E-02	2.26E+03	3.64	0.69	2.06	1.85	7.50	6.73	0.241	0.966	8.28	2.07	31.07	13.93	19.88	4.97	74.58	33.44
7	30.00	17	2.96E+07	4.91E-02	2.41E+03	3.60	0.69	2.06	1.85	7.41	6.64	0.232	0.929	8.61	2.15	31.89	14.31	20.67	5.17	76.54	34.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-77	-
Chainage	8+226	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	114.31	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-77	1.20	22.00	19.50	19.50	219.80	103.75	9.97	2.49
BH-77	1.20	23.50	21.00	21.00	233.38	115.64	10.42	2.60
BH-77	1.20	25.00	22.50	22.50	246.97	127.53	10.42	2.60
BH-77	1.20	26.50	24.00	24.00	261.09	139.41	10.42	2.60
BH-77	1.20	28.00	25.50	25.50	274.67	151.30	10.85	2.71
BH-77	1.20	29.50	27.00	27.00	288.26	163.18	10.85	2.71
BH-77	1.20	30.00	27.50	27.50	292.79	167.14	11.28	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.05	0.03	23	-	6.00	8.68	1.00	-	3.25	4.00	6.04	12.08	5.65	1.38	15.20	16.57	6.63	6.72
2	4.00	5.50	1.50	Granular	8.05	0.03	23	-	6.00	8.68	1.00	-	4.75	5.50	18.12	24.16	5.65	0.00	27.10	28.48	11.39	9.09
3	5.50	7.00	1.50	Granular	7.29	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	29.63	35.10	5.65	0.00	48.31	49.69	19.88	11.47
4	7.00	8.50	1.50	Granular	7.29	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	40.57	46.04	5.65	10.05	61.82	73.25	29.30	16.66
5	8.50	10.00	1.50	Granular	7.29	0.07	26	-	11.90	13.19	1.00	-	9.25	10.00	51.51	56.98	5.65	13.27	91.23	115.92	46.37	22.75
6	10.00	11.50	1.50	Granular	7.64	0.07	26	-	11.90	13.19	1.00	-	10.75	11.50	62.71	68.45	5.65	16.15	108.68	149.52	59.81	29.64
7	11.50	13.00	1.50	Granular	7.64	0.06	28	-	15.70	17.82	1.00	-	12.25	13.00	74.18	79.91	5.65	20.57	169.77	231.18	92.47	37.78
8	13.00	14.50	1.50	Granular	7.64	0.06	28	-	15.70	17.82	1.00	-	13.75	14.50	85.64	91.38	5.65	23.75	192.95	278.11	111.25	46.80
9	14.50	16.00	1.50	Granular	7.64	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	97.11	102.84	5.65	27.89	244.11	357.17	142.87	56.99
10	16.00	17.50	1.50	Granular	7.64	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	108.57	114.31	5.65	31.19	270.31	414.55	165.82	68.10
11	17.50	19.00	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	114.31	114.31	5.65	33.97	303.35	481.56	192.62	79.98
12	19.00	20.50	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	114.31	114.31	5.65	33.97	303.35	515.53	206.21	91.87
13	20.50	22.00	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	21.25	22.00	114.31	114.31	5.65	33.97	303.35	549.49	219.80	103.75
14	22.00	23.50	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	22.75	23.50	114.31	114.31	5.65	33.97	303.35	583.46	233.38	115.64
15	23.50	25.00	1.50	Granular	9.19	0.07	30	-	19.50	22.44	1.00	-	24.25	25.00	114.31	114.31	5.65	33.97	303.35	617.43	246.97	127.53
16	25.00	26.50	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	25.75	26.50	114.31	114.31	5.65	33.97	304.68	652.72	261.09	139.41
17	26.50	28.00	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	27.25	28.00	114.31	114.31	5.65	33.97	304.68	686.69	274.67	151.30
18	28.00	29.50	1.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	28.75	29.50	114.31	114.31	5.65	33.97	304.68	720.65	288.26	163.18
19	29.50	30.00	0.50	Granular	10.19	0.07	30	-	19.50	22.44	1.00	-	29.75	30.00	114.31	114.31	1.88	11.32	304.68	731.97	292.79	167.14

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	14	2.96E+07	1.02E-01	1.98E+03	4.33	0.58	2.08	1.85	9.00	8.02	0.201	0.803	9.97	2.49	44.83	19.99	23.92	5.98	107.58	47.97
2	22.50	15	2.96E+07	1.02E-01	2.12E+03	4.27	0.59	2.08	1.85	8.86	7.91	0.192	0.768	10.42	2.60	46.16	20.59	25.00	6.25	110.80	49.43
3	24.00	15	2.96E+07	1.02E-01	2.12E+03	4.27	0.59	2.08	1.85	8.86	7.91	0.192	0.768	10.42	2.60	46.16	20.59	25.00	6.25	110.80	49.43
4	25.50	15	2.96E+07	1.02E-01	2.12E+03	4.27	0.59	2.08	1.85	8.86	7.91	0.192	0.768	10.42	2.60	46.16	20.59	25.00	6.25	110.80	49.43
5	27.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
6	28.50	16	2.96E+07	1.02E-01	2.26E+03	4.21	0.59	2.07	1.85	8.74	7.80	0.184	0.737	10.85	2.71	47.45	21.18	26.05	6.51	113.88	50.83
7	30.00	17	2.96E+07	1.02E-01	2.41E+03	4.16	0.60	2.07	1.85	8.63	7.71	0.177	0.709	11.28	2.82	48.69	21.74	27.08	6.77	116.86	52.17

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-80	-
Chainage	8+551	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	134.60	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-80	1.20	22.00	19.50	16.50	257.04	114.98	12.46	3.12
BH-80	1.20	23.50	21.00	18.00	273.03	128.55	12.97	3.24
BH-80	1.20	25.00	22.50	19.50	289.03	142.12	13.46	3.36
BH-80	1.20	26.50	24.00	21.00	305.03	155.70	13.94	3.49
BH-80	1.20	28.00	25.50	22.50	321.03	169.27	14.41	3.60
BH-80	1.20	29.50	27.00	24.00	337.03	182.85	14.88	3.72
BH-80	1.20	30.00	27.50	24.50	342.36	187.37	14.88	3.72

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.64	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	16.67	22.41	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.64	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	28.14	33.87	5.65	6.97	47.03	54.00	21.60	13.03
4	7.00	8.50	1.50	Granular	9.59	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	41.07	48.26	5.65	10.17	66.13	83.27	33.31	18.26
5	8.50	10.00	1.50	Granular	9.59	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	55.46	62.65	5.65	14.83	119.27	151.23	60.49	24.78
6	10.00	11.50	1.50	Granular	9.59	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	69.85	77.04	5.65	18.68	144.59	195.24	78.09	32.39
7	11.50	13.00	1.50	Granular	9.59	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	84.24	91.43	5.65	22.53	169.91	243.09	97.23	41.07
8	13.00	14.50	1.50	Granular	9.59	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	98.63	105.82	5.65	26.38	195.24	294.79	117.91	50.83
9	14.50	16.00	1.50	Granular	9.59	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	113.02	120.21	5.65	31.34	253.35	384.24	153.70	61.98
10	16.00	17.50	1.50	Granular	9.59	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	127.41	134.60	5.65	35.34	282.45	448.68	179.47	74.25
11	17.50	19.00	1.50	Granular	9.59	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	134.60	134.60	5.65	40.00	355.57	561.80	224.72	87.83
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	134.60	134.60	5.65	40.00	356.37	602.59	241.04	101.40
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	134.60	134.60	5.65	40.00	356.37	642.59	257.04	114.98
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	134.60	134.60	5.65	40.00	356.37	682.59	273.03	128.55
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	134.60	134.60	5.65	40.00	356.37	722.58	289.03	142.12
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	134.60	134.60	5.65	40.00	356.37	762.58	305.03	155.70
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	134.60	134.60	5.65	40.00	356.37	802.58	321.03	169.27
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	134.60	134.60	5.65	40.00	356.37	842.57	337.03	182.85
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	134.60	134.60	1.88	13.33	356.37	855.91	342.36	187.37

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.26E+03	4.21	1.30	1.98	1.82	8.35	7.68	0.160	0.642	12.46	3.12	52.04	23.94	29.92	7.48	124.89	57.46
2	22.50	17	2.96E+07	1.02E-01	2.41E+03	4.16	1.32	1.98	1.82	8.24	7.59	0.154	0.617	12.97	3.24	53.43	24.59	31.12	7.78	128.22	59.02
3	24.00	18	2.96E+07	1.02E-01	2.55E+03	4.11	1.34	1.98	1.82	8.14	7.50	0.149	0.594	13.46	3.36	54.77	25.22	32.30	8.08	131.44	60.54
4	25.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.07	25.83	33.46	8.36	134.56	62.00
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.95	7.33	0.139	0.555	14.41	3.60	57.33	26.43	34.59	8.65	137.59	63.43
6	28.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81
7	30.00	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.538	14.88	3.72	58.55	27.00	35.71	8.93	140.53	64.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-80	-
Chainage	8+551	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	105.82	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-80	1.00	22.00	19.50	16.50	162.20	83.13	9.59	2.40
BH-80	1.00	23.50	21.00	18.00	172.68	92.11	9.98	2.50
BH-80	1.00	25.00	22.50	19.50	183.16	101.10	10.36	2.59
BH-80	1.00	26.50	24.00	21.00	193.64	110.09	10.73	2.68
BH-80	1.00	28.00	25.50	22.50	204.12	119.07	11.10	2.77
BH-80	1.00	29.50	27.00	24.00	214.60	128.06	11.45	2.86
BH-80	1.00	30.00	27.50	24.50	218.10	131.05	11.45	2.86

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.29	0.02	25	-	10.00	10.88	1.00	-	3.25	4.00	5.47	10.94	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.64	0.02	25	-	10.00	10.88	1.00	-	4.75	5.50	16.67	22.41	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.64	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	28.14	33.87	4.71	5.81	32.06	37.87	15.15	9.32
4	7.00	8.50	1.50	Granular	9.59	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	41.07	48.26	4.71	8.47	45.17	59.45	23.78	13.34
5	8.50	10.00	1.50	Granular	9.59	0.07	27	-	13.80	15.50	1.00	-	9.25	10.00	55.46	62.65	4.71	12.36	81.78	108.42	43.37	18.45
6	10.00	11.50	1.50	Granular	9.59	0.07	27	-	13.80	15.50	1.00	-	10.75	11.50	69.85	77.04	4.71	15.57	99.37	141.57	56.63	24.46
7	11.50	13.00	1.50	Granular	9.59	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	84.24	91.43	4.71	18.77	116.95	177.93	71.17	31.37
8	13.00	14.50	1.50	Granular	9.59	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	98.63	105.82	4.71	21.98	134.54	217.50	87.00	39.17
9	14.50	16.00	1.50	Granular	9.59	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	105.82	105.82	4.71	24.46	154.54	261.96	104.78	47.67
10	16.00	17.50	1.50	Granular	9.59	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	105.82	105.82	4.71	24.46	154.54	286.41	114.57	56.17
11	17.50	19.00	1.50	Granular	9.59	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	105.82	105.82	4.71	26.20	194.55	352.62	141.05	65.15
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	105.82	105.82	4.71	26.20	195.01	379.29	151.72	74.14
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	105.82	105.82	4.71	26.20	195.01	405.49	162.20	83.13
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	105.82	105.82	4.71	26.20	195.01	431.70	172.68	92.11
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	105.82	105.82	4.71	26.20	195.01	457.90	183.16	101.10
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	105.82	105.82	4.71	26.20	195.01	484.10	193.64	110.09
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	105.82	105.82	4.71	26.20	195.01	510.31	204.12	119.07
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	105.82	105.82	4.71	26.20	195.01	536.51	214.60	128.06
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	105.82	105.82	1.57	8.73	195.01	545.25	218.10	131.05

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.26E+03	3.64	1.51	1.96	1.82	7.14	6.62	0.208	0.834	9.59	2.40	34.27	15.87	23.03	5.76	82.26	38.09
2	22.50	17	2.96E+07	4.91E-02	2.41E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.801	9.98	2.50	35.19	16.30	23.96	5.99	84.46	39.13
3	24.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.96	6.46	0.193	0.772	10.36	2.59	36.07	16.72	24.87	6.22	86.58	40.13
4	25.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.93	17.13	25.76	6.44	88.63	41.11
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.10	2.77	37.76	17.52	26.63	6.66	90.63	42.05
6	28.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97
7	30.00	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.175	0.698	11.45	2.86	38.57	17.90	27.49	6.87	92.56	42.97

A.10. Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-82	1.00	22.00	19.50	16.50	314.86	142.78	10.00	2.50	152.74	80.29	10.00	2.50
BH-82	1.00	23.50	21.00	18.00	334.78	158.38	10.20	2.55	162.46	88.75	10.20	2.55
BH-82	1.00	25.00	22.50	19.50	354.70	173.97	10.38	2.60	172.19	97.21	10.38	2.60
BH-82	1.00	26.50	24.00	21.00	374.63	189.57	10.53	2.63	181.91	105.66	10.53	2.63
BH-82	1.00	28.00	25.50	22.50	394.55	205.16	10.72	2.68	191.63	114.12	10.72	2.68
BH-82	1.00	29.50	27.00	24.00	414.47	220.76	11.03	2.76	201.36	122.57	11.03	2.76
BH-82	1.00	30.00	27.50	24.50	421.11	225.96	11.30	2.82	204.60	125.39	11.30	2.82
BH-82	1.20	22.00	19.50	16.50	454.85	186.32	12.99	3.25	242.82	111.34	12.99	3.25
BH-82	1.20	23.50	21.00	18.00	482.04	207.73	13.25	3.31	257.77	124.17	13.25	3.31
BH-82	1.20	25.00	22.50	19.50	509.22	229.13	13.48	3.37	272.71	137.01	13.48	3.37
BH-82	1.20	26.50	24.00	21.00	536.41	250.54	13.68	3.42	287.66	149.85	13.68	3.42
BH-82	1.20	28.00	25.50	22.50	563.59	271.94	13.93	3.48	302.61	162.69	13.93	3.48
BH-82	1.20	29.50	27.00	24.00	590.78	293.35	14.33	3.58	317.56	175.53	14.33	3.58
BH-82	1.20	30.00	27.50	24.50	599.84	300.48	14.67	3.67	322.54	179.81	14.67	3.67
BH-83	1.00	22.00	19.50	16.50	320.00	144.37	11.99	3.00	158.26	82.16	11.99	3.00
BH-83	1.00	23.50	21.00	18.00	340.32	160.25	12.10	3.03	168.39	90.89	12.10	3.03
BH-83	1.00	25.00	22.50	19.50	360.64	176.12	12.39	3.10	178.51	99.63	12.39	3.10
BH-83	1.00	26.50	24.00	21.00	380.97	192.00	12.64	3.16	188.64	108.37	12.64	3.16
BH-83	1.00	28.00	25.50	22.50	401.29	207.88	12.84	3.21	198.76	117.10	12.84	3.21

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-83	1.00	29.50	27.00	24.00	421.62	223.75	13.02	3.25	208.89	125.84	13.02	3.25
BH-83	1.00	30.00	27.50	24.50	428.39	229.05	13.16	3.29	212.26	128.75	13.16	3.29
BH-83	1.20	22.00	19.50	16.50	465.94	189.06	15.58	3.90	254.38	114.40	15.58	3.90
BH-83	1.20	23.50	21.00	18.00	493.97	211.05	15.72	3.93	270.16	127.82	15.72	3.93
BH-83	1.20	25.00	22.50	19.50	521.99	233.04	16.10	4.02	285.95	141.25	16.10	4.02
BH-83	1.20	26.50	24.00	21.00	550.01	255.03	16.42	4.11	301.73	154.67	16.42	4.11
BH-83	1.20	28.00	25.50	22.50	578.04	277.03	16.69	4.17	317.52	168.10	16.69	4.17
BH-83	1.20	29.50	27.00	24.00	606.06	299.02	16.91	4.23	333.30	181.52	16.91	4.23
BH-83	1.20	30.00	27.50	24.50	615.40	306.35	17.10	4.27	338.57	186.00	17.10	4.27
BH-84	1.00	22.00	19.50	13.50	317.45	138.01	11.87	2.97	144.34	75.12	11.87	2.97
BH-84	1.00	23.50	21.00	15.00	338.69	154.53	12.16	3.04	153.92	83.48	12.16	3.04
BH-84	1.00	25.00	22.50	16.50	359.93	171.05	12.50	3.13	163.50	91.83	12.50	3.13
BH-84	1.00	26.50	24.00	18.00	381.16	187.56	12.79	3.20	173.09	100.19	12.79	3.20
BH-84	1.00	28.00	25.50	19.50	402.40	204.08	13.03	3.26	182.67	108.55	13.03	3.26
BH-84	1.00	29.50	27.00	21.00	423.64	220.60	13.22	3.31	192.25	116.90	13.22	3.31
BH-84	1.00	30.00	27.50	21.50	430.72	226.10	13.38	3.34	195.44	119.69	13.38	3.34
BH-84	1.20	22.00	19.50	13.50	487.34	186.96	15.51	3.88	236.86	106.04	15.51	3.88
BH-84	1.20	23.50	21.00	15.00	518.21	210.95	15.88	3.97	251.99	119.01	15.88	3.97
BH-84	1.20	25.00	22.50	16.50	549.08	234.93	16.33	4.08	267.13	131.98	16.33	4.08
BH-84	1.20	26.50	24.00	18.00	579.95	258.91	16.72	4.18	282.26	144.95	16.72	4.18
BH-84	1.20	28.00	25.50	19.50	610.82	282.90	17.03	4.26	297.40	157.92	17.03	4.26
BH-84	1.20	29.50	27.00	21.00	641.69	306.88	17.29	4.32	312.53	170.89	17.29	4.32
BH-84	1.20	30.00	27.50	21.50	651.98	314.88	17.49	4.37	317.57	175.21	17.49	4.37
BH-85	1.00	22.00	19.50	16.50	321.23	145.24	11.33	2.83	158.85	82.56	11.33	2.83
BH-85	1.00	23.50	21.00	18.00	341.56	161.12	11.48	2.87	168.97	91.30	11.48	2.87

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-85	1.00	25.00	22.50	19.50	361.88	176.99	11.64	2.91	179.10	100.04	11.64	2.91
BH-85	1.00	26.50	24.00	21.00	382.21	192.87	11.91	2.98	189.22	108.78	11.91	2.98
BH-85	1.00	28.00	25.50	22.50	402.53	208.74	12.12	3.03	199.35	117.51	12.12	3.03
BH-85	1.00	29.50	27.00	24.00	422.86	224.62	12.30	3.08	209.47	126.25	12.30	3.08
BH-85	1.00	30.00	27.50	24.50	429.63	229.91	12.44	3.11	212.85	129.16	12.44	3.11
BH-85	1.20	22.00	19.50	16.50	467.55	190.19	14.72	3.68	255.20	114.98	14.72	3.68
BH-85	1.20	23.50	21.00	18.00	495.58	212.18	14.92	3.73	270.99	128.40	14.92	3.73
BH-85	1.20	25.00	22.50	19.50	523.60	234.17	15.13	3.78	286.77	141.82	15.13	3.78
BH-85	1.20	26.50	24.00	21.00	551.62	256.16	15.47	3.87	302.56	155.25	15.47	3.87
BH-85	1.20	28.00	25.50	22.50	579.65	278.15	15.75	3.94	318.34	168.67	15.75	3.94
BH-85	1.20	29.50	27.00	24.00	607.67	300.14	15.98	4.00	334.13	182.10	15.98	4.00
BH-85	1.20	30.00	27.50	24.50	617.01	307.48	16.16	4.04	339.39	186.57	16.16	4.04
BH-86	1.00	22.00	19.50	12.00	315.35	131.64	10.66	2.66	151.42	75.17	10.66	2.66
BH-86	1.00	23.50	21.00	13.50	337.57	148.85	10.90	2.73	161.98	84.22	10.90	2.73
BH-86	1.00	25.00	22.50	15.00	359.79	166.05	11.19	2.80	172.54	93.26	11.19	2.80
BH-86	1.00	26.50	24.00	16.50	382.01	183.25	11.61	2.90	183.11	102.30	11.61	2.90
BH-86	1.00	28.00	25.50	18.00	404.23	200.45	11.96	2.99	193.67	111.35	11.96	2.99
BH-86	1.00	29.50	27.00	19.50	426.45	217.66	12.26	3.07	204.23	120.39	12.26	3.07
BH-86	1.00	30.00	27.50	20.00	433.85	223.39	12.50	3.13	207.75	123.40	12.50	3.13
BH-86	1.20	22.00	19.50	12.00	459.05	172.73	13.97	3.49	242.35	104.96	13.97	3.49
BH-86	1.20	23.50	21.00	13.50	488.99	196.06	14.30	3.57	258.30	118.50	14.30	3.57
BH-86	1.20	25.00	22.50	15.00	518.93	219.39	14.68	3.67	274.26	132.05	14.68	3.67
BH-86	1.20	26.50	24.00	16.50	548.87	242.73	15.24	3.81	290.21	145.59	15.24	3.81
BH-86	1.20	28.00	25.50	18.00	578.81	266.06	15.70	3.93	306.16	159.13	15.70	3.93
BH-86	1.20	29.50	27.00	19.50	608.76	289.40	16.10	4.03	322.12	172.68	16.10	4.03

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-86	1.20	30.00	27.50	20.00	618.74	297.18	16.42	4.11	327.44	177.19	16.42	4.11
BH-87	1.00	22.00	19.50	15.00	295.93	133.98	11.38	2.84	137.55	74.11	11.38	2.84
BH-87	1.00	23.50	21.00	16.50	315.01	148.99	11.53	2.88	146.43	81.98	11.53	2.88
BH-87	1.00	25.00	22.50	18.00	334.09	163.99	11.90	2.98	155.31	89.84	11.90	2.98
BH-87	1.00	26.50	24.00	19.50	353.16	178.99	12.21	3.05	164.19	97.70	12.21	3.05
BH-87	1.00	28.00	25.50	21.00	372.24	194.00	12.47	3.12	173.06	105.57	12.47	3.12
BH-87	1.00	29.50	27.00	22.50	391.32	209.00	12.69	3.17	181.94	113.43	12.69	3.17
BH-87	1.00	30.00	27.50	23.00	397.68	214.00	12.86	3.22	184.90	116.05	12.86	3.22
BH-87	1.20	22.00	19.50	15.00	421.75	173.69	14.80	3.70	214.21	101.84	14.80	3.70
BH-87	1.20	23.50	21.00	16.50	447.24	193.91	15.01	3.75	227.46	113.50	15.01	3.75
BH-87	1.20	25.00	22.50	18.00	472.74	214.13	15.48	3.87	240.72	125.15	15.48	3.87
BH-87	1.20	26.50	24.00	19.50	498.23	234.35	15.89	3.97	253.97	136.80	15.89	3.97
BH-87	1.20	28.00	25.50	21.00	523.72	254.57	16.23	4.06	267.22	148.45	16.23	4.06
BH-87	1.20	29.50	27.00	22.50	549.21	274.79	16.51	4.13	280.47	160.10	16.51	4.13
BH-87	1.20	30.00	27.50	23.00	557.71	281.53	16.74	4.18	284.89	163.99	16.74	4.18
BH-88	1.00	22.00	19.50	12.00	305.91	129.26	11.26	2.81	140.52	71.77	11.26	2.81
BH-88	1.00	23.50	21.00	13.50	327.33	145.90	11.76	2.94	150.28	80.25	11.76	2.94
BH-88	1.00	25.00	22.50	15.00	348.75	162.55	12.17	3.04	160.04	88.74	12.17	3.04
BH-88	1.00	26.50	24.00	16.50	370.47	179.19	12.52	3.13	170.11	97.22	12.52	3.13
BH-88	1.00	28.00	25.50	18.00	391.89	195.83	12.80	3.20	179.87	105.70	12.80	3.20
BH-88	1.00	29.50	27.00	19.50	413.30	212.47	13.05	3.26	189.63	114.18	13.05	3.26
BH-88	1.00	30.00	27.50	20.00	420.44	218.02	13.25	3.31	192.89	117.01	13.25	3.31
BH-88	1.20	22.00	19.50	12.00	448.19	170.42	14.77	3.69	229.74	101.43	14.77	3.69
BH-88	1.20	23.50	21.00	13.50	477.31	193.18	15.43	3.86	244.88	114.40	15.43	3.86
BH-88	1.20	25.00	22.50	15.00	506.43	215.94	15.98	4.00	260.01	127.37	15.98	4.00

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-88	1.20	26.50	24.00	16.50	536.09	238.70	16.44	4.11	275.68	140.34	16.44	4.11
BH-88	1.20	28.00	25.50	18.00	565.21	261.46	16.83	4.21	290.81	153.31	16.83	4.21
BH-88	1.20	29.50	27.00	19.50	594.33	284.22	17.15	4.29	305.94	166.28	17.15	4.29
BH-88	1.20	30.00	27.50	20.00	604.04	291.81	17.41	4.35	310.99	170.60	17.41	4.35
BH-89	1.00	22.00	19.50	12.00	248.95	125.35	11.89	2.97	126.01	74.52	11.89	2.97
BH-89	1.00	23.50	21.00	13.50	267.62	140.06	12.34	3.08	135.50	82.81	12.34	3.08
BH-89	1.00	25.00	22.50	15.00	302.68	155.26	12.70	3.18	153.53	91.35	12.70	3.18
BH-89	1.00	26.50	24.00	16.50	322.03	170.46	13.01	3.25	163.37	99.88	13.01	3.25
BH-89	1.00	28.00	25.50	18.00	373.91	186.63	13.27	3.32	190.03	108.91	13.27	3.32
BH-89	1.00	29.50	27.00	19.50	394.65	202.80	13.48	3.37	200.57	117.94	13.48	3.37
BH-89	1.00	30.00	27.50	20.00	401.56	208.19	13.66	3.41	204.09	120.95	13.66	3.41
BH-89	1.20	22.00	19.50	12.00	359.87	165.98	15.61	3.90	200.26	104.98	15.61	3.90
BH-89	1.20	23.50	21.00	13.50	385.54	186.32	16.20	4.05	214.91	117.62	16.20	4.05
BH-89	1.20	25.00	22.50	15.00	438.10	207.33	16.69	4.17	245.24	130.63	16.69	4.17
BH-89	1.20	26.50	24.00	16.50	464.73	228.34	17.10	4.28	260.44	143.65	17.10	4.28
BH-89	1.20	28.00	25.50	18.00	544.68	250.68	17.44	4.36	306.54	157.42	17.44	4.36
BH-89	1.20	29.50	27.00	19.50	573.21	273.02	17.73	4.43	322.83	171.19	17.73	4.43
BH-89	1.20	30.00	27.50	20.00	582.71	280.47	17.96	4.49	328.26	175.78	17.96	4.49

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-82	-
Chainage	8+859	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	201.14	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.45	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-82	1.00	22.00	19.50	16.50	314.86	142.78	10.00	2.50
BH-82	1.00	23.50	21.00	18.00	334.78	158.38	10.20	2.55
BH-82	1.00	25.00	22.50	19.50	354.70	173.97	10.38	2.60
BH-82	1.00	26.50	24.00	21.00	374.63	189.57	10.53	2.63
BH-82	1.00	28.00	25.50	22.50	394.55	205.16	10.72	2.68
BH-82	1.00	29.50	27.00	24.00	414.47	220.76	11.03	2.76
BH-82	1.00	30.00	27.50	24.50	421.11	225.96	11.30	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.24	26.48	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.71	52.95	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.65	0.01	25	-	10.00	10.88	1.00	-	6.25	7.00	66.19	79.43	4.71	13.66	75.07	88.73	35.49	11.52
4	7.00	8.50	1.50	Granular	17.65	0.01	25	-	10.00	10.88	1.00	-	7.75	8.50	92.66	105.90	4.71	19.12	97.77	130.55	52.22	18.52
5	8.50	10.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	119.14	132.38	4.71	25.57	145.92	204.27	81.71	27.33
6	10.00	11.50	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	145.61	158.85	4.71	31.25	173.45	263.05	105.22	37.73
7	11.50	13.00	1.50	Granular	19.00	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	173.10	187.35	4.71	40.01	274.85	404.46	161.78	50.58
8	13.00	14.50	1.50	Granular	9.19	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	194.25	201.14	4.71	44.89	288.15	462.65	185.06	64.80
9	14.50	16.00	1.50	Granular	9.19	0.04	30	-	19.50	22.44	1.00	-	15.25	16.00	201.14	201.14	4.71	49.81	362.84	587.14	234.86	80.40
10	16.00	17.50	1.50	Granular	9.19	0.04	30	-	19.50	22.44	1.00	-	16.75	17.50	201.14	201.14	4.71	49.81	362.84	636.95	254.78	95.99
11	17.50	19.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	201.14	201.14	4.71	49.81	362.84	686.76	274.70	111.59
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	201.14	201.14	4.71	49.81	363.61	737.34	294.93	127.19
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	201.14	201.14	4.71	49.81	363.61	787.14	314.86	142.78
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	201.14	201.14	4.71	49.81	363.61	836.95	334.78	158.38
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	201.14	201.14	4.71	49.81	363.61	886.76	354.70	173.97
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	201.14	201.14	4.71	49.81	363.61	936.57	374.63	189.57
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	201.14	201.14	4.71	49.81	363.61	986.38	394.55	205.16
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	201.14	201.14	4.71	49.81	363.61	1036.18	414.47	220.76
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	201.14	201.14	1.57	16.60	363.61	1052.79	421.11	225.96

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.42E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.800	10.00	2.50	35.24	16.33	24.01	6.00	84.57	39.19
2	22.50	18	2.96E+07	4.91E-02	2.49E+03	3.57	1.54	1.96	1.82	7.00	6.49	0.196	0.784	10.20	2.55	35.70	16.55	24.48	6.12	85.68	39.71
3	24.00	18	2.96E+07	4.91E-02	2.56E+03	3.55	1.55	1.96	1.82	6.96	6.45	0.193	0.771	10.38	2.60	36.12	16.74	24.91	6.23	86.69	40.19
4	25.50	18	2.96E+07	4.91E-02	2.62E+03	3.54	1.55	1.96	1.82	6.93	6.42	0.190	0.759	10.53	2.63	36.48	16.91	25.28	6.32	87.54	40.59
5	27.00	19	2.96E+07	4.91E-02	2.69E+03	3.52	1.56	1.96	1.81	6.88	6.39	0.187	0.746	10.72	2.68	36.91	17.12	25.73	6.43	88.58	41.08
6	28.50	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.181	0.725	11.03	2.76	37.62	17.45	26.48	6.62	90.29	41.89
7	30.00	21	2.96E+07	4.91E-02	2.92E+03	3.46	1.59	1.95	1.81	6.77	6.28	0.177	0.708	11.30	2.82	38.21	17.74	27.11	6.78	91.72	42.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-82	-
Chainage	8+100	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	228.72	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.45	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-82	1.20	22.00	19.50	16.50	454.85	186.32	12.99	3.25
BH-82	1.20	23.50	21.00	18.00	482.04	207.73	13.25	3.31
BH-82	1.20	25.00	22.50	19.50	509.22	229.13	13.48	3.37
BH-82	1.20	26.50	24.00	21.00	536.41	250.54	13.68	3.42
BH-82	1.20	28.00	25.50	22.50	563.59	271.94	13.93	3.48
BH-82	1.20	29.50	27.00	24.00	590.78	293.35	14.33	3.58
BH-82	1.20	30.00	27.50	24.50	599.84	300.48	14.67	3.67

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.24	26.48	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.71	52.95	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.65	0.01	25	-	10.00	10.88	1.00	-	6.25	7.00	66.19	79.43	5.65	16.39	110.10	126.49	50.60	15.67
4	7.00	8.50	1.50	Granular	17.65	0.01	25	-	10.00	10.88	1.00	-	7.75	8.50	92.66	105.90	5.65	22.95	142.80	182.13	72.85	24.47
5	8.50	10.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	119.14	132.38	5.65	30.68	212.52	282.53	113.01	35.44
6	10.00	11.50	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	145.61	158.85	5.65	37.50	252.16	359.68	143.87	48.31
7	11.50	13.00	1.50	Granular	19.00	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	173.10	187.35	5.65	48.01	399.17	554.70	221.88	64.13
8	13.00	14.50	1.50	Granular	9.19	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	194.25	201.14	5.65	53.87	416.57	625.97	250.39	81.59
9	14.50	16.00	1.50	Granular	9.19	0.04	30	-	19.50	22.44	1.00	-	15.25	16.00	208.04	214.93	5.65	61.82	559.64	830.86	332.34	101.27
10	16.00	17.50	1.50	Granular	9.19	0.04	30	-	19.50	22.44	1.00	-	16.75	17.50	221.83	228.72	5.65	65.92	594.77	931.90	372.76	122.11
11	17.50	19.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	228.72	228.72	5.65	67.97	594.77	999.87	399.95	143.51
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	228.72	228.72	5.65	67.97	596.10	1069.16	427.66	164.92
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	228.72	228.72	5.65	67.97	596.10	1137.12	454.85	186.32
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	228.72	228.72	5.65	67.97	596.10	1205.09	482.04	207.73
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	228.72	228.72	5.65	67.97	596.10	1273.05	509.22	229.13
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	228.72	228.72	5.65	67.97	596.10	1341.02	536.41	250.54
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	228.72	228.72	5.65	67.97	596.10	1408.99	563.59	271.94
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	228.72	228.72	5.65	67.97	596.10	1476.95	590.78	293.35
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	228.72	228.72	1.88	22.66	596.10	1499.61	599.84	300.48

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.42E+03	4.16	1.32	1.98	1.82	8.23	7.58	0.154	0.616	12.99	3.25	53.50	24.63	31.19	7.80	128.40	59.11
2	22.50	18	2.96E+07	1.02E-01	2.49E+03	4.14	1.33	1.98	1.82	8.18	7.53	0.151	0.604	13.25	3.31	54.20	24.96	31.80	7.95	130.08	59.90
3	24.00	18	2.96E+07	1.02E-01	2.56E+03	4.11	1.34	1.98	1.82	8.13	7.49	0.148	0.593	13.48	3.37	54.84	25.26	32.36	8.09	131.61	60.62
4	25.50	18	2.96E+07	1.02E-01	2.62E+03	4.09	1.34	1.98	1.82	8.09	7.46	0.146	0.585	13.68	3.42	55.38	25.51	32.84	8.21	132.90	61.22
5	27.00	19	2.96E+07	1.02E-01	2.69E+03	4.07	1.35	1.98	1.82	8.05	7.41	0.144	0.574	13.93	3.48	56.03	25.82	33.43	8.36	134.48	61.96
6	28.50	20	2.96E+07	1.02E-01	2.82E+03	4.03	1.36	1.98	1.82	7.97	7.35	0.140	0.558	14.33	3.58	57.12	26.33	34.40	8.60	137.08	63.19
7	30.00	21	2.96E+07	1.02E-01	2.92E+03	4.01	1.37	1.97	1.82	7.91	7.29	0.136	0.545	14.67	3.67	58.02	26.75	35.22	8.80	139.24	64.20

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-83	-
Chainage	8+793	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	205.19	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-83	1.00	22.00	19.50	16.50	320.00	144.37	11.99	3.00
BH-83	1.00	23.50	21.00	18.00	340.32	160.25	12.10	3.03
BH-83	1.00	25.00	22.50	19.50	360.64	176.12	12.39	3.10
BH-83	1.00	26.50	24.00	21.00	380.97	192.00	12.64	3.16
BH-83	1.00	28.00	25.50	22.50	401.29	207.88	12.84	3.21
BH-83	1.00	29.50	27.00	24.00	421.62	223.75	13.02	3.25
BH-83	1.00	30.00	27.50	24.50	428.39	229.05	13.16	3.29

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.24	26.48	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.71	52.95	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.19	79.43	4.71	14.20	90.87	105.07	42.03	11.67
4	7.00	8.50	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	92.66	105.90	4.71	19.89	118.40	152.49	60.99	18.89
5	8.50	10.00	1.50	Granular	19.00	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	120.15	134.40	4.71	25.79	148.66	208.54	83.42	27.76
6	10.00	11.50	1.50	Granular	19.00	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	148.65	162.90	4.71	31.90	178.30	270.08	108.03	38.34
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	177.15	191.40	4.71	40.94	280.54	413.26	165.30	51.46
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	198.30	205.19	4.71	45.83	293.84	472.39	188.96	65.94
9	14.50	16.00	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	15.25	16.00	205.19	205.19	4.71	50.81	370.77	600.13	240.05	81.81
10	16.00	17.50	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	16.75	17.50	205.19	205.19	4.71	50.81	370.77	650.94	260.38	97.69
11	17.50	19.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	205.19	205.19	4.71	49.12	332.61	661.90	264.76	113.09
12	19.00	20.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	205.19	205.19	4.71	49.12	332.61	711.02	284.41	128.49
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	205.19	205.19	4.71	50.81	370.77	799.99	320.00	144.37
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	205.19	205.19	4.71	50.81	370.77	850.80	340.32	160.25
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	205.19	205.19	4.71	50.81	370.77	901.61	360.64	176.12
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	205.19	205.19	4.71	50.81	370.77	952.42	380.97	192.00
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	205.19	205.19	4.71	50.81	370.77	1003.23	401.29	207.88
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	205.19	205.19	4.71	50.81	370.77	1054.04	421.62	223.75
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	205.19	205.19	1.57	16.94	370.77	1070.98	428.39	229.05

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.667	11.99	3.00	39.77	18.47	28.78	7.20	95.45	44.34
2	22.50	23	2.96E+07	4.91E-02	3.25E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.661	12.10	3.03	40.01	18.59	29.04	7.26	96.02	44.61
3	24.00	24	2.96E+07	4.91E-02	3.37E+03	3.36	1.64	1.95	1.81	6.56	6.10	0.161	0.646	12.39	3.10	40.65	18.89	29.74	7.44	97.56	45.33
4	25.50	24	2.96E+07	4.91E-02	3.48E+03	3.34	1.65	1.95	1.81	6.52	6.06	0.158	0.633	12.64	3.16	41.19	19.15	30.34	7.58	98.85	45.95
5	27.00	25	2.96E+07	4.91E-02	3.57E+03	3.33	1.65	1.95	1.81	6.48	6.03	0.156	0.623	12.84	3.21	41.63	19.35	30.83	7.71	99.91	46.45
6	28.50	26	2.96E+07	4.91E-02	3.64E+03	3.31	1.66	1.95	1.81	6.45	6.00	0.154	0.615	13.02	3.25	42.01	19.53	31.24	7.81	100.81	46.88
7	30.00	26	2.96E+07	4.91E-02	3.71E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.31	19.68	31.58	7.90	101.54	47.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-83	-
Chainage	8+793	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.77	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-83	1.20	22.00	19.50	16.50	465.94	189.06	15.58	3.90
BH-83	1.20	23.50	21.00	18.00	493.97	211.05	15.72	3.93
BH-83	1.20	25.00	22.50	19.50	521.99	233.04	16.10	4.02
BH-83	1.20	26.50	24.00	21.00	550.01	255.03	16.42	4.11
BH-83	1.20	28.00	25.50	22.50	578.04	277.03	16.69	4.17
BH-83	1.20	29.50	27.00	24.00	606.06	299.02	16.91	4.23
BH-83	1.20	30.00	27.50	24.50	615.40	306.35	17.10	4.27

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.24	26.48	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.71	52.95	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.19	79.43	5.65	17.05	133.23	150.28	60.11	15.86
4	7.00	8.50	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	92.66	105.90	5.65	23.86	172.87	213.78	85.51	24.91
5	8.50	10.00	1.50	Granular	19.00	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	120.15	134.40	5.65	30.94	216.64	288.49	115.40	35.95
6	10.00	11.50	1.50	Granular	19.00	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	148.65	162.90	5.65	38.28	259.32	369.45	147.78	49.05
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	177.15	191.40	5.65	49.13	407.36	566.63	226.65	65.18
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	198.30	205.19	5.65	55.00	424.76	639.03	255.61	82.95
9	14.50	16.00	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	15.25	16.00	212.84	220.48	5.65	63.24	575.11	852.61	341.05	103.04
10	16.00	17.50	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	16.75	17.50	228.13	235.77	5.65	67.79	614.05	959.35	383.74	124.39
11	17.50	19.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	235.77	235.77	5.65	67.72	550.86	963.88	385.55	145.73
12	19.00	20.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	235.77	235.77	5.65	67.72	550.86	1031.61	412.64	167.07
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	235.77	235.77	5.65	70.06	614.05	1164.86	465.94	189.06
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	235.77	235.77	5.65	70.06	614.05	1234.92	493.97	211.05
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	235.77	235.77	5.65	70.06	614.05	1304.98	521.99	233.04
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	235.77	235.77	5.65	70.06	614.05	1375.04	550.01	255.03
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	235.77	235.77	5.65	70.06	614.05	1445.10	578.04	277.03
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	235.77	235.77	5.65	70.06	614.05	1515.16	606.06	299.02
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	235.77	235.77	1.88	23.35	614.05	1538.51	615.40	306.35

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.58	3.90	60.38	27.87	37.39	9.35	144.92	66.88
2	22.50	23	2.96E+07	1.02E-01	3.25E+03	3.92	1.40	1.97	1.82	7.73	7.13	0.127	0.509	15.72	3.93	60.74	28.03	37.73	9.43	145.78	67.28
3	24.00	24	2.96E+07	1.02E-01	3.37E+03	3.89	1.41	1.97	1.82	7.67	7.08	0.124	0.497	16.10	4.02	61.71	28.49	38.64	9.66	148.11	68.38
4	25.50	24	2.96E+07	1.02E-01	3.48E+03	3.87	1.42	1.97	1.82	7.62	7.03	0.122	0.487	16.42	4.11	62.53	28.88	39.41	9.85	150.08	69.31
5	27.00	25	2.96E+07	1.02E-01	3.57E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.479	16.69	4.17	63.20	29.20	40.05	10.01	151.69	70.07
6	28.50	26	2.96E+07	1.02E-01	3.64E+03	3.83	1.44	1.97	1.82	7.54	6.97	0.118	0.473	16.91	4.23	63.78	29.47	40.59	10.15	153.06	70.72
7	30.00	26	2.96E+07	1.02E-01	3.71E+03	3.82	1.44	1.97	1.82	7.51	6.95	0.117	0.468	17.10	4.27	64.23	29.68	41.03	10.26	154.16	71.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-84	-
Chainage	8+939	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	214.43	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Groundwater Level from OGL	16.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-84	1.00	22.00	19.50	13.50	317.45	138.01	11.87	2.97
BH-84	1.00	23.50	21.00	15.00	338.69	154.53	12.16	3.04
BH-84	1.00	25.00	22.50	16.50	359.93	171.05	12.50	3.13
BH-84	1.00	26.50	24.00	18.00	381.16	187.56	12.79	3.20
BH-84	1.00	28.00	25.50	19.50	402.40	204.08	13.03	3.26
BH-84	1.00	29.50	27.00	21.00	423.64	220.60	13.22	3.31
BH-84	1.00	30.00	27.50	21.50	430.72	226.10	13.38	3.34

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.50	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	37.13	49.50	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	62.74	75.98	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.21	102.45	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	115.69	128.93	4.71	24.83	142.34	167.17	66.87	17.95
6	10.00	11.50	1.50	Granular	19.00	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	143.18	157.43	4.71	30.73	172.61	228.16	91.26	28.20
7	11.50	13.00	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	171.68	185.93	4.71	41.09	308.16	404.81	161.92	41.36
8	13.00	14.50	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	200.18	214.43	4.71	47.92	353.37	497.94	199.18	56.42
9	14.50	16.00	1.50	Granular	20.00	0.07	29	-	17.60	20.13	1.00	-	15.25	16.00	214.43	214.43	4.71	51.33	354.07	549.96	219.98	72.44
10	16.00	17.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	214.43	214.43	4.71	51.33	347.26	594.49	237.79	88.46
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	214.43	214.43	4.71	53.10	387.10	687.42	274.97	104.98
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	214.43	214.43	4.71	53.10	387.10	740.52	296.21	121.50
13	20.50	22.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	214.43	214.43	4.71	53.10	387.10	793.62	317.45	138.01
14	22.00	23.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	214.43	214.43	4.71	53.10	387.10	846.72	338.69	154.53
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	214.43	214.43	4.71	53.10	387.10	899.81	359.93	171.05
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	214.43	214.43	4.71	53.10	387.10	952.91	381.16	187.56
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	214.43	214.43	4.71	53.10	387.10	1006.01	402.40	204.08
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	214.43	214.43	4.71	53.10	387.10	1059.11	423.64	220.60
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	214.43	214.43	1.57	17.70	387.10	1076.81	430.72	226.10

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.78E+03	3.50	2.43	1.90	1.80	6.65	6.28	0.168	0.674	11.87	2.97	39.51	18.64	28.50	7.12	94.82	44.74
2	22.50	20	2.96E+07	4.91E-02	2.88E+03	3.47	2.45	1.90	1.80	6.60	6.23	0.165	0.658	12.16	3.04	40.13	18.94	29.18	7.29	96.32	45.47
3	24.00	21	2.96E+07	4.91E-02	3.01E+03	3.44	2.47	1.90	1.80	6.54	6.18	0.160	0.640	12.50	3.13	40.89	19.30	30.00	7.50	98.13	46.33
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	2.49	1.90	1.80	6.49	6.13	0.156	0.625	12.79	3.20	41.52	19.61	30.70	7.67	99.64	47.05
5	27.00	23	2.96E+07	4.91E-02	3.22E+03	3.40	2.50	1.90	1.80	6.45	6.09	0.154	0.614	13.03	3.26	42.02	19.85	31.26	7.82	100.86	47.64
6	28.50	23	2.96E+07	4.91E-02	3.30E+03	3.38	2.52	1.90	1.79	6.42	6.07	0.151	0.605	13.22	3.31	42.45	20.05	31.74	7.93	101.88	48.13
7	30.00	24	2.96E+07	4.91E-02	3.36E+03	3.37	2.52	1.90	1.79	6.40	6.04	0.150	0.598	13.38	3.34	42.78	20.21	32.11	8.03	102.66	48.50

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-84	-
Chainage	8+939	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	259.72	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Groundwater Level from OGL	16.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-84	1.20	22.00	19.50	13.50	487.34	186.96	15.51	3.88
BH-84	1.20	23.50	21.00	15.00	518.21	210.95	15.88	3.97
BH-84	1.20	25.00	22.50	16.50	549.08	234.93	16.33	4.08
BH-84	1.20	26.50	24.00	18.00	579.95	258.91	16.72	4.18
BH-84	1.20	28.00	25.50	19.50	610.82	282.90	17.03	4.26
BH-84	1.20	29.50	27.00	21.00	641.69	306.88	17.29	4.32
BH-84	1.20	30.00	27.50	21.50	651.98	314.88	17.49	4.37

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.50	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	37.13	49.50	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	62.74	75.98	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.21	102.45	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	115.69	128.93	5.65	29.79	207.35	237.14	94.86	24.18
6	10.00	11.50	1.50	Granular	19.00	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	143.18	157.43	5.65	36.87	251.12	317.78	127.11	36.88
7	11.50	13.00	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	171.68	185.93	5.65	49.31	447.54	563.52	225.41	53.06
8	13.00	14.50	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	200.18	214.43	5.65	57.50	512.65	686.13	274.45	71.53
9	14.50	16.00	1.50	Granular	20.00	0.07	29	-	17.60	20.13	1.00	-	15.25	16.00	229.43	244.43	5.65	65.90	582.39	821.77	328.71	92.36
10	16.00	17.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	252.07	259.72	5.65	72.41	605.57	917.36	366.94	115.01
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	259.72	259.72	5.65	77.18	675.04	1064.01	425.60	138.99
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	259.72	259.72	5.65	77.18	675.04	1141.18	456.47	162.98
13	20.50	22.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	259.72	259.72	5.65	77.18	675.04	1218.36	487.34	186.96
14	22.00	23.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	259.72	259.72	5.65	77.18	675.04	1295.53	518.21	210.95
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	259.72	259.72	5.65	77.18	675.04	1372.71	549.08	234.93
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	259.72	259.72	5.65	77.18	675.04	1449.88	579.95	258.91
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	259.72	259.72	5.65	77.18	675.04	1527.06	610.82	282.90
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	259.72	259.72	5.65	77.18	675.04	1604.23	641.69	306.88
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	259.72	259.72	1.88	25.73	675.04	1629.96	651.98	314.88

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.78E+03	4.05	2.10	1.92	1.80	7.76	7.29	0.129	0.516	15.51	3.88	60.19	28.26	37.22	9.30	144.46	67.83
2	22.50	20	2.96E+07	1.02E-01	2.88E+03	4.02	2.12	1.92	1.80	7.70	7.23	0.126	0.504	15.88	3.97	61.16	28.72	38.11	9.53	146.77	68.94
3	24.00	21	2.96E+07	1.02E-01	3.01E+03	3.98	2.14	1.92	1.80	7.63	7.17	0.122	0.490	16.33	4.08	62.31	29.28	39.20	9.80	149.55	70.26
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	2.15	1.92	1.80	7.57	7.12	0.120	0.479	16.72	4.18	63.28	29.74	40.12	10.03	151.88	71.38
5	27.00	23	2.96E+07	1.02E-01	3.22E+03	3.93	2.16	1.92	1.80	7.53	7.07	0.117	0.470	17.03	4.26	64.06	30.11	40.86	10.22	153.75	72.27
6	28.50	23	2.96E+07	1.02E-01	3.30E+03	3.91	2.17	1.91	1.80	7.49	7.04	0.116	0.463	17.29	4.32	64.72	30.43	41.49	10.37	155.32	73.02
7	30.00	24	2.96E+07	1.02E-01	3.36E+03	3.90	2.18	1.91	1.80	7.46	7.01	0.114	0.457	17.49	4.37	65.22	30.67	41.97	10.49	156.52	73.60

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-85	-
Chainage	9+024	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	205.19	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-85	1.00	22.00	19.50	16.50	321.23	145.24	11.33	2.83
BH-85	1.00	23.50	21.00	18.00	341.56	161.12	11.48	2.87
BH-85	1.00	25.00	22.50	19.50	361.88	176.99	11.64	2.91
BH-85	1.00	26.50	24.00	21.00	382.21	192.87	11.91	2.98
BH-85	1.00	28.00	25.50	22.50	402.53	208.74	12.12	3.03
BH-85	1.00	29.50	27.00	24.00	422.86	224.62	12.30	3.08
BH-85	1.00	30.00	27.50	24.50	429.63	229.91	12.44	3.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.24	26.48	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.71	52.95	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.19	79.43	4.71	14.20	90.87	105.07	42.03	11.67
4	7.00	8.50	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	92.66	105.90	4.71	19.89	118.40	152.49	60.99	18.89
5	8.50	10.00	1.50	Granular	19.00	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	120.15	134.40	4.71	25.79	148.66	208.54	83.42	27.76
6	10.00	11.50	1.50	Granular	19.00	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	148.65	162.90	4.71	31.90	178.30	270.08	108.03	38.34
7	11.50	13.00	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	177.15	191.40	4.71	42.41	316.84	451.03	180.41	51.87
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	198.30	205.19	4.71	47.47	331.92	513.57	205.43	66.81
9	14.50	16.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	15.25	16.00	205.19	205.19	4.71	49.12	332.61	563.38	225.35	82.21
10	16.00	17.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	205.19	205.19	4.71	49.12	332.61	612.50	245.00	97.61
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	205.19	205.19	4.71	50.81	370.77	701.46	280.59	113.49
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	205.19	205.19	4.71	50.81	370.77	752.28	300.91	129.36
13	20.50	22.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	205.19	205.19	4.71	50.81	370.77	803.09	321.23	145.24
14	22.00	23.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	205.19	205.19	4.71	50.81	370.77	853.90	341.56	161.12
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	205.19	205.19	4.71	50.81	370.77	904.71	361.88	176.99
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	205.19	205.19	4.71	50.81	370.77	955.52	382.21	192.87
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	205.19	205.19	4.71	50.81	370.77	1006.33	402.53	208.74
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	205.19	205.19	4.71	50.81	370.77	1057.14	422.86	224.62
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	205.19	205.19	1.57	16.94	370.77	1074.08	429.63	229.91

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.93E+03	3.46	1.59	1.95	1.81	6.76	6.27	0.177	0.706	11.33	2.83	38.29	17.77	27.19	6.80	91.89	42.65
2	22.50	21	2.96E+07	4.91E-02	3.00E+03	3.44	1.60	1.95	1.81	6.73	6.25	0.174	0.697	11.48	2.87	38.63	17.93	27.56	6.89	92.72	43.04
3	24.00	22	2.96E+07	4.91E-02	3.06E+03	3.43	1.60	1.95	1.81	6.70	6.22	0.172	0.687	11.64	2.91	39.00	18.11	27.95	6.99	93.59	43.46
4	25.50	22	2.96E+07	4.91E-02	3.17E+03	3.41	1.62	1.95	1.81	6.65	6.18	0.168	0.672	11.91	2.98	39.59	18.39	28.58	7.15	95.01	44.12
5	27.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.660	12.12	3.03	40.06	18.61	29.10	7.27	96.14	44.66
6	28.50	23	2.96E+07	4.91E-02	3.34E+03	3.37	1.63	1.95	1.81	6.58	6.11	0.163	0.650	12.30	3.08	40.45	18.80	29.53	7.38	97.09	45.11
7	30.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	1.64	1.95	1.81	6.55	6.09	0.161	0.643	12.44	3.11	40.76	18.94	29.86	7.47	97.82	45.46

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-85	-
Chainage	9+024	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.77	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-85	1.20	22.00	19.50	16.50	467.55	190.19	14.72	3.68
BH-85	1.20	23.50	21.00	18.00	495.58	212.18	14.92	3.73
BH-85	1.20	25.00	22.50	19.50	523.60	234.17	15.13	3.78
BH-85	1.20	26.50	24.00	21.00	551.62	256.16	15.47	3.87
BH-85	1.20	28.00	25.50	22.50	579.65	278.15	15.75	3.94
BH-85	1.20	29.50	27.00	24.00	607.67	300.14	15.98	4.00
BH-85	1.20	30.00	27.50	24.50	617.01	307.48	16.16	4.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.24	26.48	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.65	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.71	52.95	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.19	79.43	5.65	17.05	133.23	150.28	60.11	15.86
4	7.00	8.50	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	92.66	105.90	5.65	23.86	172.87	213.78	85.51	24.91
5	8.50	10.00	1.50	Granular	19.00	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	120.15	134.40	5.65	30.94	216.64	288.49	115.40	35.95
6	10.00	11.50	1.50	Granular	19.00	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	148.65	162.90	5.65	38.28	259.32	369.45	147.78	49.05
7	11.50	13.00	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	177.15	191.40	5.65	50.89	460.05	621.07	248.43	65.67
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	198.30	205.19	5.65	56.96	479.80	697.78	279.11	83.99
9	14.50	16.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	15.25	16.00	212.84	220.48	5.65	61.14	515.93	795.05	318.02	103.49
10	16.00	17.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	228.13	235.77	5.65	65.53	550.86	895.51	358.20	124.21
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	235.77	235.77	5.65	70.06	614.05	1028.76	411.50	146.20
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	235.77	235.77	5.65	70.06	614.05	1098.82	439.53	168.19
13	20.50	22.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	235.77	235.77	5.65	70.06	614.05	1168.88	467.55	190.19
14	22.00	23.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	235.77	235.77	5.65	70.06	614.05	1238.94	495.58	212.18
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	235.77	235.77	5.65	70.06	614.05	1309.00	523.60	234.17
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	235.77	235.77	5.65	70.06	614.05	1379.06	551.62	256.16
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	235.77	235.77	5.65	70.06	614.05	1449.12	579.65	278.15
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	235.77	235.77	5.65	70.06	614.05	1519.18	607.67	300.14
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	235.77	235.77	1.88	23.35	614.05	1542.53	617.01	307.48

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.37	1.97	1.82	7.90	7.29	0.136	0.544	14.72	3.68	58.13	26.80	35.32	8.83	139.51	64.33
2	22.50	21	2.96E+07	1.02E-01	3.00E+03	3.99	1.38	1.97	1.82	7.86	7.25	0.134	0.536	14.92	3.73	58.65	27.05	35.80	8.95	140.77	64.92
3	24.00	22	2.96E+07	1.02E-01	3.06E+03	3.97	1.39	1.97	1.82	7.83	7.22	0.132	0.529	15.13	3.78	59.21	27.31	36.31	9.08	142.09	65.55
4	25.50	22	2.96E+07	1.02E-01	3.17E+03	3.94	1.40	1.97	1.82	7.77	7.17	0.129	0.517	15.47	3.87	60.10	27.73	37.13	9.28	144.24	66.56
5	27.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.508	15.75	3.94	60.82	28.07	37.80	9.45	145.96	67.37
6	28.50	23	2.96E+07	1.02E-01	3.34E+03	3.90	1.41	1.97	1.82	7.69	7.10	0.125	0.501	15.98	4.00	61.42	28.35	38.36	9.59	147.41	68.05
7	30.00	24	2.96E+07	1.02E-01	3.40E+03	3.89	1.42	1.97	1.82	7.66	7.07	0.124	0.495	16.16	4.04	61.88	28.57	38.79	9.70	148.51	68.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-86	-
Chainage	9+115	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	224.33	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	14.95	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-86	1.00	22.00	19.50	12.00	315.35	131.64	10.66	2.66
BH-86	1.00	23.50	21.00	13.50	337.57	148.85	10.90	2.73
BH-86	1.00	25.00	22.50	15.00	359.79	166.05	11.19	2.80
BH-86	1.00	26.50	24.00	16.50	382.01	183.25	11.61	2.90
BH-86	1.00	28.00	25.50	18.00	404.23	200.45	11.96	2.99
BH-86	1.00	29.50	27.00	19.50	426.45	217.66	12.26	3.07
BH-86	1.00	30.00	27.50	20.00	433.85	223.39	12.50	3.13

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	13.24	26.48	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.65	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	39.71	52.95	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.19	79.43	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	19.40	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	93.98	108.53	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	123.08	137.63	4.71	0.00	0.00	0.00	0.00	11.00
6	10.00	11.50	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	152.18	166.73	4.71	32.66	182.46	215.12	86.05	21.79
7	11.50	13.00	1.50	Granular	19.40	0.10	25	-	10.00	10.88	1.00	-	12.25	13.00	181.28	195.83	4.71	37.41	175.58	245.65	98.26	33.91
8	13.00	14.50	1.50	Granular	19.00	0.10	25	-	10.00	10.88	1.00	-	13.75	14.50	210.08	224.33	4.71	43.35	199.87	313.28	125.31	47.70
9	14.50	16.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	224.33	224.33	4.71	53.70	362.28	529.39	211.76	64.38
10	16.00	17.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	224.33	224.33	4.71	53.70	362.28	583.09	233.24	81.07
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	224.33	224.33	4.71	53.70	362.97	637.48	254.99	97.75
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	224.33	224.33	4.71	53.70	362.97	691.18	276.47	114.44
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	224.33	224.33	4.71	55.55	404.61	788.37	315.35	131.64
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	224.33	224.33	4.71	55.55	404.61	843.92	337.57	148.85
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	224.33	224.33	4.71	55.55	404.61	899.47	359.79	166.05
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	224.33	224.33	4.71	55.55	404.61	955.02	382.01	183.25
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	224.33	224.33	4.71	55.55	404.61	1010.57	404.23	200.45
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	224.33	224.33	4.71	55.55	404.61	1066.12	426.45	217.66
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	224.33	224.33	1.57	18.52	404.61	1084.63	433.85	223.39

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.25E+03	3.65	2.74	1.89	1.79	6.90	6.53	0.188	0.751	10.66	2.66	36.76	17.40	25.57	6.39	88.21	41.76
2	22.50	17	2.96E+07	4.91E-02	2.34E+03	3.62	2.76	1.89	1.79	6.85	6.48	0.183	0.734	10.90	2.73	37.32	17.67	26.17	6.54	89.57	42.41
3	24.00	17	2.96E+07	4.91E-02	2.44E+03	3.59	2.79	1.89	1.79	6.79	6.43	0.179	0.715	11.19	2.80	37.97	17.98	26.86	6.71	91.14	43.16
4	25.50	18	2.96E+07	4.91E-02	2.59E+03	3.55	2.82	1.89	1.79	6.70	6.35	0.172	0.689	11.61	2.90	38.92	18.44	27.87	6.97	93.42	44.25
5	27.00	19	2.96E+07	4.91E-02	2.71E+03	3.51	2.85	1.89	1.79	6.64	6.29	0.167	0.669	11.96	2.99	39.70	18.81	28.71	7.18	95.28	45.15
6	28.50	20	2.96E+07	4.91E-02	2.82E+03	3.49	2.87	1.89	1.79	6.58	6.24	0.163	0.653	12.26	3.07	40.36	19.12	29.42	7.36	96.86	45.90
7	30.00	21	2.96E+07	4.91E-02	2.91E+03	3.46	2.89	1.89	1.79	6.54	6.20	0.160	0.640	12.50	3.13	40.89	19.38	30.01	7.50	98.14	46.51

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-86	-
Chainage	9+115	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	251.91	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	14.95	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-86	1.20	22.00	19.50	12.00	459.05	172.73	13.97	3.49
BH-86	1.20	23.50	21.00	13.50	488.99	196.06	14.30	3.57
BH-86	1.20	25.00	22.50	15.00	518.93	219.39	14.68	3.67
BH-86	1.20	26.50	24.00	16.50	548.87	242.73	15.24	3.81
BH-86	1.20	28.00	25.50	18.00	578.81	266.06	15.70	3.93
BH-86	1.20	29.50	27.00	19.50	608.76	289.40	16.10	4.03
BH-86	1.20	30.00	27.50	20.00	618.74	297.18	16.42	4.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	13.24	26.48	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.65	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	39.71	52.95	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	66.19	79.43	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	19.40	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	93.98	108.53	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	123.08	137.63	5.65	0.00	0.00	0.00	0.00	15.83
6	10.00	11.50	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	152.18	166.73	5.65	39.19	265.37	304.56	121.82	29.18
7	11.50	13.00	1.50	Granular	19.40	0.10	25	-	10.00	10.88	1.00	-	12.25	13.00	181.28	195.83	5.65	44.89	255.04	339.12	135.65	44.13
8	13.00	14.50	1.50	Granular	19.00	0.10	25	-	10.00	10.88	1.00	-	13.75	14.50	210.08	224.33	5.65	52.02	289.96	426.06	170.43	61.07
9	14.50	16.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	231.22	238.12	5.65	66.42	555.02	757.54	303.02	82.04
10	16.00	17.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	245.01	251.91	5.65	70.38	586.53	859.42	343.77	104.12
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	251.91	251.91	5.65	72.36	587.72	932.98	373.19	126.76
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	251.91	251.91	5.65	72.36	587.72	1005.34	402.14	149.39
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	251.91	251.91	5.65	74.85	655.15	1147.62	459.05	172.73
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	251.91	251.91	5.65	74.85	655.15	1222.47	488.99	196.06
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	251.91	251.91	5.65	74.85	655.15	1297.33	518.93	219.39
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	251.91	251.91	5.65	74.85	655.15	1372.18	548.87	242.73
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	251.91	251.91	5.65	74.85	655.15	1447.04	578.81	266.06
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	251.91	251.91	5.65	74.85	655.15	1521.89	608.76	289.40
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	251.91	251.91	1.88	24.95	655.15	1546.84	618.74	297.18

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.25E+03	4.22	2.37	1.91	1.80	8.04	7.58	0.143	0.573	13.97	3.49	56.14	26.47	33.53	8.38	134.74	63.54
2	22.50	17	2.96E+07	1.02E-01	2.34E+03	4.19	2.39	1.90	1.80	7.98	7.52	0.140	0.560	14.30	3.57	57.02	26.89	34.31	8.58	136.85	64.54
3	24.00	17	2.96E+07	1.02E-01	2.44E+03	4.15	2.41	1.90	1.80	7.91	7.46	0.136	0.545	14.68	3.67	58.03	27.38	35.23	8.81	139.27	65.70
4	25.50	18	2.96E+07	1.02E-01	2.59E+03	4.10	2.44	1.90	1.80	7.81	7.37	0.131	0.525	15.24	3.81	59.50	28.08	36.58	9.14	142.80	67.39
5	27.00	19	2.96E+07	1.02E-01	2.71E+03	4.06	2.46	1.90	1.80	7.73	7.30	0.127	0.509	15.70	3.93	60.70	28.66	37.69	9.42	145.68	68.77
6	28.50	20	2.96E+07	1.02E-01	2.82E+03	4.03	2.48	1.90	1.80	7.67	7.24	0.124	0.497	16.10	4.03	61.72	29.14	38.64	9.66	148.13	69.94
7	30.00	21	2.96E+07	1.02E-01	2.91E+03	4.01	2.50	1.90	1.80	7.62	7.19	0.122	0.487	16.42	4.11	62.54	29.54	39.42	9.85	150.10	70.89

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-87	-
Chainage	9+244	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	192.59	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-87	1.00	22.00	19.50	15.00	295.93	133.98	11.38	2.84
BH-87	1.00	23.50	21.00	16.50	315.01	148.99	11.53	2.88
BH-87	1.00	25.00	22.50	18.00	334.09	163.99	11.90	2.98
BH-87	1.00	26.50	24.00	19.50	353.16	178.99	12.21	3.05
BH-87	1.00	28.00	25.50	21.00	372.24	194.00	12.47	3.12
BH-87	1.00	29.50	27.00	22.50	391.32	209.00	12.69	3.17
BH-87	1.00	30.00	27.50	23.00	397.68	214.00	12.86	3.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.45	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.09	26.18	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.45	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.26	52.35	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.45	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	65.44	78.53	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.45	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	91.61	104.70	4.71	19.66	117.05	136.71	54.69	14.85
5	8.50	10.00	1.50	Granular	17.10	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	117.53	130.35	4.71	26.19	168.60	214.45	85.78	23.83
6	10.00	11.50	1.50	Granular	17.10	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	143.18	156.00	4.71	31.91	199.94	277.70	111.08	34.42
7	11.50	13.00	1.50	Granular	17.10	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	168.83	181.65	4.71	39.02	265.67	382.45	152.98	46.99
8	13.00	14.50	1.50	Granular	7.29	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	187.12	192.59	4.71	43.25	274.97	435.00	174.00	60.75
9	14.50	16.00	1.50	Granular	7.29	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	192.59	192.59	4.71	46.10	310.61	516.74	206.70	75.31
10	16.00	17.50	1.50	Granular	7.29	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	192.59	192.59	4.71	46.10	310.61	562.84	225.14	89.87
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	192.59	192.59	4.71	46.10	311.93	610.26	244.10	104.42
12	19.00	20.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	192.59	192.59	4.71	46.10	311.93	656.36	262.54	118.98
13	20.50	22.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	192.59	192.59	4.71	47.69	347.71	739.84	295.93	133.98
14	22.00	23.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	192.59	192.59	4.71	47.69	347.71	787.53	315.01	148.99
15	23.50	25.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	192.59	192.59	4.71	47.69	347.71	835.22	334.09	163.99
16	25.00	26.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	192.59	192.59	4.71	47.69	347.71	882.91	353.16	178.99
17	26.50	28.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	192.59	192.59	4.71	47.69	347.71	930.60	372.24	194.00
18	28.00	29.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	192.59	192.59	4.71	47.69	347.71	978.29	391.32	209.00
19	29.50	30.00	0.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	192.59	192.59	1.57	15.90	347.71	994.19	397.68	214.00

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.74E+03	3.51	2.00	1.93	1.80	6.75	6.33	0.176	0.703	11.38	2.84	38.40	17.99	27.31	6.83	92.15	43.18
2	22.50	20	2.96E+07	4.91E-02	2.80E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.173	0.694	11.53	2.88	38.75	18.16	27.68	6.92	93.00	43.59
3	24.00	21	2.96E+07	4.91E-02	2.94E+03	3.46	2.02	1.92	1.80	6.65	6.24	0.168	0.672	11.90	2.98	39.57	18.55	28.56	7.14	94.96	44.53
4	25.50	22	2.96E+07	4.91E-02	3.06E+03	3.43	2.04	1.92	1.80	6.59	6.18	0.164	0.655	12.21	3.05	40.25	18.88	29.31	7.33	96.61	45.31
5	27.00	22	2.96E+07	4.91E-02	3.16E+03	3.41	2.05	1.92	1.80	6.55	6.14	0.160	0.642	12.47	3.12	40.81	19.15	29.92	7.48	97.96	45.96
6	28.50	23	2.96E+07	4.91E-02	3.25E+03	3.39	2.07	1.92	1.80	6.51	6.11	0.158	0.631	12.69	3.17	41.29	19.37	30.45	7.61	99.09	46.50
7	30.00	23	2.96E+07	4.91E-02	3.32E+03	3.37	2.07	1.92	1.80	6.48	6.08	0.156	0.622	12.86	3.22	41.67	19.55	30.86	7.72	100.00	46.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-87	-
Chainage	9+244	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	214.47	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-87	1.20	22.00	19.50	15.00	421.75	173.69	14.80	3.70
BH-87	1.20	23.50	21.00	16.50	447.24	193.91	15.01	3.75
BH-87	1.20	25.00	22.50	18.00	472.74	214.13	15.48	3.87
BH-87	1.20	26.50	24.00	19.50	498.23	234.35	15.89	3.97
BH-87	1.20	28.00	25.50	21.00	523.72	254.57	16.23	4.06
BH-87	1.20	29.50	27.00	22.50	549.21	274.79	16.51	4.13
BH-87	1.20	30.00	27.50	23.00	557.71	281.53	16.74	4.18

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.45	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	13.09	26.18	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.45	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	39.26	52.35	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.45	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	65.44	78.53	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.45	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	91.61	104.70	5.65	23.59	170.91	194.51	77.80	20.06
5	8.50	10.00	1.50	Granular	17.10	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	117.53	130.35	5.65	31.43	245.46	300.48	120.19	31.24
6	10.00	11.50	1.50	Granular	17.10	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	143.18	156.00	5.65	38.29	290.60	383.91	153.56	44.34
7	11.50	13.00	1.50	Granular	17.10	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	168.83	181.65	5.65	46.82	385.62	525.75	210.30	59.82
8	13.00	14.50	1.50	Granular	7.29	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	187.12	192.59	5.65	51.90	397.25	589.29	235.71	76.73
9	14.50	16.00	1.50	Granular	7.29	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	198.06	203.53	5.65	56.89	473.73	722.66	289.06	95.03
10	16.00	17.50	1.50	Granular	7.29	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	209.00	214.47	5.65	60.04	498.72	807.69	323.07	114.22
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	214.47	214.47	5.65	61.61	501.00	871.57	348.63	133.84
12	19.00	20.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	214.47	214.47	5.65	61.61	501.00	933.18	373.27	153.47
13	20.50	22.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	214.47	214.47	5.65	63.73	558.47	1054.38	421.75	173.69
14	22.00	23.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	214.47	214.47	5.65	63.73	558.47	1118.11	447.24	193.91
15	23.50	25.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	214.47	214.47	5.65	63.73	558.47	1181.84	472.74	214.13
16	25.00	26.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	214.47	214.47	5.65	63.73	558.47	1245.57	498.23	234.35
17	26.50	28.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	214.47	214.47	5.65	63.73	558.47	1309.30	523.72	254.57
18	28.00	29.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	214.47	214.47	5.65	63.73	558.47	1373.03	549.21	274.79
19	29.50	30.00	0.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	214.47	214.47	1.88	21.24	558.47	1394.27	557.71	281.53

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.74E+03	4.06	1.73	1.94	1.81	7.88	7.35	0.135	0.541	14.80	3.70	58.35	27.18	35.52	8.88	140.04	65.23
2	22.50	20	2.96E+07	1.02E-01	2.80E+03	4.04	1.73	1.94	1.81	7.85	7.31	0.133	0.533	15.01	3.75	58.89	27.43	36.01	9.00	141.33	65.84
3	24.00	21	2.96E+07	1.02E-01	2.94E+03	4.00	1.75	1.94	1.81	7.77	7.24	0.129	0.517	15.48	3.87	60.13	28.03	37.16	9.29	144.32	67.26
4	25.50	22	2.96E+07	1.02E-01	3.06E+03	3.97	1.76	1.94	1.81	7.70	7.18	0.126	0.503	15.89	3.97	61.18	28.53	38.14	9.53	146.84	68.46
5	27.00	22	2.96E+07	1.02E-01	3.16E+03	3.94	1.78	1.94	1.81	7.65	7.13	0.123	0.493	16.23	4.06	62.04	28.93	38.94	9.74	148.89	69.44
6	28.50	23	2.96E+07	1.02E-01	3.25E+03	3.92	1.79	1.94	1.81	7.60	7.09	0.121	0.485	16.51	4.13	62.76	29.28	39.63	9.91	150.63	70.26
7	30.00	23	2.96E+07	1.02E-01	3.32E+03	3.90	1.79	1.94	1.81	7.57	7.06	0.119	0.478	16.74	4.18	63.34	29.55	40.17	10.04	152.01	70.92

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-88	-
Chainage	9+346	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	216.23	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	15.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-88	1.00	22.00	19.50	12.00	305.91	129.26	11.26	2.81
BH-88	1.00	23.50	21.00	13.50	327.33	145.90	11.76	2.94
BH-88	1.00	25.00	22.50	15.00	348.75	162.55	12.17	3.04
BH-88	1.00	26.50	24.00	16.50	370.47	179.19	12.52	3.13
BH-88	1.00	28.00	25.50	18.00	391.89	195.83	12.80	3.20
BH-88	1.00	29.50	27.00	19.50	413.30	212.47	13.05	3.26
BH-88	1.00	30.00	27.50	20.00	420.44	218.02	13.25	3.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.50	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	37.13	49.50	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.65	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	62.74	75.98	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.65	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	89.21	102.45	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	17.65	0.00	26	-	11.90	13.19	1.00	-	9.25	10.00	115.69	128.93	4.71	0.00	0.00	0.00	0.00	11.00
6	10.00	11.50	1.50	Granular	19.40	0.00	26	-	11.90	13.19	1.00	-	10.75	11.50	143.48	158.03	4.71	30.79	173.42	204.21	81.68	21.27
7	11.50	13.00	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	172.58	187.13	4.71	37.04	203.68	271.50	108.60	33.29
8	13.00	14.50	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	201.68	216.23	4.71	43.28	233.94	345.04	138.02	47.05
9	14.50	16.00	1.50	Granular	9.59	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	216.23	216.23	4.71	51.76	349.70	512.57	205.03	63.20
10	16.00	17.50	1.50	Granular	9.59	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	216.23	216.23	4.71	51.76	349.70	564.33	225.73	79.34
11	17.50	19.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	216.23	216.23	4.71	53.54	389.52	657.69	263.08	95.98
12	19.00	20.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	216.23	216.23	4.71	53.54	389.52	711.23	284.49	112.62
13	20.50	22.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	216.23	216.23	4.71	53.54	389.52	764.78	305.91	129.26
14	22.00	23.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	216.23	216.23	4.71	53.54	389.52	818.32	327.33	145.90
15	23.50	25.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	216.23	216.23	4.71	53.54	389.52	871.86	348.75	162.55
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	216.23	216.23	4.71	53.54	390.29	926.18	370.47	179.19
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	216.23	216.23	4.71	53.54	390.29	979.72	391.89	195.83
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	216.23	216.23	4.71	53.54	390.29	1033.26	413.30	212.47
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	216.23	216.23	1.57	17.85	390.29	1051.11	420.44	218.02

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.46E+03	3.58	2.79	1.89	1.79	6.77	6.42	0.178	0.711	11.26	2.81	38.13	18.06	27.02	6.75	91.50	43.34
2	22.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	2.83	1.89	1.79	6.68	6.33	0.170	0.680	11.76	2.94	39.25	18.59	28.22	7.05	94.20	44.63
3	24.00	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.86	1.89	1.79	6.60	6.25	0.164	0.657	12.17	3.04	40.16	19.03	29.21	7.30	96.38	45.67
4	25.50	21	2.96E+07	4.91E-02	2.92E+03	3.46	2.89	1.89	1.79	6.54	6.20	0.160	0.639	12.52	3.13	40.92	19.39	30.04	7.51	98.21	46.55
5	27.00	21	2.96E+07	4.91E-02	3.03E+03	3.44	2.91	1.89	1.79	6.49	6.15	0.156	0.625	12.80	3.20	41.55	19.69	30.73	7.68	99.71	47.26
6	28.50	22	2.96E+07	4.91E-02	3.12E+03	3.42	2.93	1.89	1.79	6.45	6.11	0.153	0.613	13.05	3.26	42.07	19.94	31.32	7.83	100.97	47.87
7	30.00	22	2.96E+07	4.91E-02	3.20E+03	3.40	2.94	1.89	1.79	6.42	6.08	0.151	0.604	13.25	3.31	42.49	20.15	31.79	7.95	101.98	48.35

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-88	-
Chainage	9+346	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	245.01	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	15.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-88	1.20	22.00	19.50	12.00	448.19	170.42	14.77	3.69
BH-88	1.20	23.50	21.00	13.50	477.31	193.18	15.43	3.86
BH-88	1.20	25.00	22.50	15.00	506.43	215.94	15.98	4.00
BH-88	1.20	26.50	24.00	16.50	536.09	238.70	16.44	4.11
BH-88	1.20	28.00	25.50	18.00	565.21	261.46	16.83	4.21
BH-88	1.20	29.50	27.00	19.50	594.33	284.22	17.15	4.29
BH-88	1.20	30.00	27.50	20.00	604.04	291.81	17.41	4.35

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.50	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	37.13	49.50	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.65	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	62.74	75.98	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.65	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	89.21	102.45	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	17.65	0.00	26	-	11.90	13.19	1.00	-	9.25	10.00	115.69	128.93	5.65	0.00	0.00	0.00	0.00	15.83
6	10.00	11.50	1.50	Granular	19.40	0.00	26	-	11.90	13.19	1.00	-	10.75	11.50	143.48	158.03	5.65	36.95	252.34	289.29	115.72	28.55
7	11.50	13.00	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	172.58	187.13	5.65	44.44	295.91	377.31	150.92	43.37
8	13.00	14.50	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	201.68	216.23	5.65	51.94	339.49	472.82	189.13	60.29
9	14.50	16.00	1.50	Granular	9.59	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	223.42	230.62	5.65	64.18	538.37	735.87	294.35	80.64
10	16.00	17.50	1.50	Granular	9.59	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	237.81	245.01	5.65	68.31	571.24	837.06	334.82	102.14
11	17.50	19.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	245.01	245.01	5.65	72.80	636.25	974.87	389.95	124.90
12	19.00	20.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	245.01	245.01	5.65	72.80	636.25	1047.67	419.07	147.66
13	20.50	22.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	245.01	245.01	5.65	72.80	636.25	1120.48	448.19	170.42
14	22.00	23.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	245.01	245.01	5.65	72.80	636.25	1193.28	477.31	193.18
15	23.50	25.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	245.01	245.01	5.65	72.80	636.25	1266.09	506.43	215.94
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	245.01	245.01	5.65	72.80	637.57	1340.22	536.09	238.70
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	245.01	245.01	5.65	72.80	637.57	1413.02	565.21	261.46
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	245.01	245.01	5.65	72.80	637.57	1485.83	594.33	284.22
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	245.01	245.01	1.88	24.27	637.57	1510.10	604.04	291.81

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.46E+03	4.14	2.41	1.90	1.80	7.89	7.45	0.135	0.542	14.77	3.69	58.26	27.49	35.44	8.86	139.83	65.97
2	22.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	2.45	1.90	1.80	7.78	7.34	0.130	0.518	15.43	3.86	60.00	28.32	37.04	9.26	144.01	67.97
3	24.00	20	2.96E+07	1.02E-01	2.79E+03	4.04	2.47	1.90	1.80	7.69	7.26	0.125	0.501	15.98	4.00	61.41	29.00	38.35	9.59	147.39	69.59
4	25.50	21	2.96E+07	1.02E-01	2.92E+03	4.01	2.50	1.90	1.80	7.61	7.19	0.122	0.487	16.44	4.11	62.59	29.56	39.47	9.87	150.22	70.95
5	27.00	21	2.96E+07	1.02E-01	3.03E+03	3.98	2.51	1.90	1.79	7.55	7.14	0.119	0.475	16.83	4.21	63.56	30.02	40.38	10.10	152.54	72.06
6	28.50	22	2.96E+07	1.02E-01	3.12E+03	3.95	2.53	1.90	1.79	7.51	7.09	0.117	0.466	17.15	4.29	64.38	30.41	41.16	10.29	154.50	73.00
7	30.00	22	2.96E+07	1.02E-01	3.20E+03	3.93	2.54	1.90	1.79	7.47	7.06	0.115	0.459	17.41	4.35	65.03	30.73	41.79	10.45	156.07	73.75

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-89	-
Chainage	9+428	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	209.39	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	13.40	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-89	1.00	22.00	19.50	12.00	248.95	125.35	11.89	2.97
BH-89	1.00	23.50	21.00	13.50	267.62	140.06	12.34	3.08
BH-89	1.00	25.00	22.50	15.00	302.68	155.26	12.70	3.18
BH-89	1.00	26.50	24.00	16.50	322.03	170.46	13.01	3.25
BH-89	1.00	28.00	25.50	18.00	373.91	186.63	13.27	3.32
BH-89	1.00	29.50	27.00	19.50	394.65	202.80	13.48	3.37
BH-89	1.00	30.00	27.50	20.00	401.56	208.19	13.66	3.41

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.65	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	37.99	51.23	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	64.46	77.70	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	19.40	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	92.25	106.80	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	121.35	135.90	4.71	0.00	0.00	0.00	0.00	11.00
6	10.00	11.50	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	150.45	165.00	4.71	32.29	180.67	212.96	85.18	21.69
7	11.50	13.00	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	179.55	194.10	4.71	38.53	210.93	281.75	112.70	34.12
8	13.00	14.50	1.50	Granular	10.19	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	201.75	209.39	4.71	43.30	222.51	336.63	134.65	47.90
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	209.39	209.39	4.71	48.39	300.35	462.87	185.15	63.10
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	209.39	209.39	4.71	48.39	300.35	511.26	204.50	78.30
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	209.39	209.39	4.71	51.85	378.20	640.96	256.38	94.46
12	19.00	20.50	1.50	Granular	9.59	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	209.39	209.39	4.71	51.85	377.74	692.35	276.94	110.63
13	20.50	22.00	1.50	Granular	9.59	0.10	27	-	13.80	15.50	1.00	-	21.25	22.00	209.39	209.39	4.71	46.67	261.11	622.38	248.95	125.35
14	22.00	23.50	1.50	Granular	9.59	0.10	27	-	13.80	15.50	1.00	-	22.75	23.50	209.39	209.39	4.71	46.67	261.11	669.05	267.62	140.06
15	23.50	25.00	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	209.39	209.39	4.71	48.39	300.35	756.69	302.68	155.26
16	25.00	26.50	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	25.75	26.50	209.39	209.39	4.71	48.39	300.35	805.08	322.03	170.46
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	209.39	209.39	4.71	51.85	378.20	934.78	373.91	186.63
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	209.39	209.39	4.71	51.85	378.20	986.63	394.65	202.80
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	209.39	209.39	1.57	17.28	378.20	1003.91	401.56	208.19

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.69E+03	3.52	2.84	1.89	1.79	6.65	6.30	0.168	0.673	11.89	2.97	39.54	18.73	28.53	7.13	94.89	44.96
2	22.50	20	2.96E+07	4.91E-02	2.85E+03	3.48	2.87	1.89	1.79	6.57	6.23	0.162	0.649	12.34	3.08	40.52	19.20	29.61	7.40	97.26	46.09
3	24.00	21	2.96E+07	4.91E-02	2.99E+03	3.45	2.90	1.89	1.79	6.51	6.17	0.157	0.630	12.70	3.18	41.32	19.59	30.48	7.62	99.17	47.00
4	25.50	22	2.96E+07	4.91E-02	3.11E+03	3.42	2.92	1.89	1.79	6.45	6.12	0.154	0.615	13.01	3.25	41.99	19.91	31.23	7.81	100.78	47.77
5	27.00	23	2.96E+07	4.91E-02	3.21E+03	3.40	2.94	1.89	1.79	6.41	6.08	0.151	0.603	13.27	3.32	42.54	20.17	31.84	7.96	102.09	48.40
6	28.50	23	2.96E+07	4.91E-02	3.29E+03	3.38	2.96	1.89	1.79	6.38	6.05	0.148	0.593	13.48	3.37	43.00	20.39	32.36	8.09	103.20	48.93
7	30.00	24	2.96E+07	4.91E-02	3.36E+03	3.37	2.97	1.89	1.79	6.35	6.02	0.146	0.586	13.66	3.41	43.37	20.56	32.77	8.19	104.08	49.35

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-89	-
Chainage	9+428	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	239.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	13.40	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-89	1.20	22.00	19.50	12.00	359.87	165.98	15.61	3.90
BH-89	1.20	23.50	21.00	13.50	385.54	186.32	16.20	4.05
BH-89	1.20	25.00	22.50	15.00	438.10	207.33	16.69	4.17
BH-89	1.20	26.50	24.00	16.50	464.73	228.34	17.10	4.28
BH-89	1.20	28.00	25.50	18.00	544.68	250.68	17.44	4.36
BH-89	1.20	29.50	27.00	19.50	573.21	273.02	17.73	4.43
BH-89	1.20	30.00	27.50	20.00	582.71	280.47	17.96	4.49

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.65	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	37.99	51.23	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.65	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	64.46	77.70	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	19.40	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	92.25	106.80	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	121.35	135.90	5.65	0.00	0.00	0.00	0.00	15.83
6	10.00	11.50	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	150.45	165.00	5.65	38.75	262.79	301.53	120.61	29.06
7	11.50	13.00	1.50	Granular	19.40	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	179.55	194.10	5.65	46.24	306.36	391.34	156.54	44.38
8	13.00	14.50	1.50	Granular	10.19	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	201.75	209.39	5.65	51.96	321.79	458.73	183.49	61.30
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	217.04	224.68	5.65	60.19	465.25	662.38	264.95	80.53
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	232.33	239.97	5.65	64.43	496.17	757.73	303.09	100.95
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	239.97	239.97	5.65	71.31	624.75	957.63	383.05	123.29
12	19.00	20.50	1.50	Granular	9.59	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	239.97	239.97	5.65	71.31	623.95	1028.14	411.26	145.63
13	20.50	22.00	1.50	Granular	9.59	0.10	27	-	13.80	15.50	1.00	-	21.25	22.00	239.97	239.97	5.65	64.18	431.31	899.67	359.87	165.98
14	22.00	23.50	1.50	Granular	9.59	0.10	27	-	13.80	15.50	1.00	-	22.75	23.50	239.97	239.97	5.65	64.18	431.31	963.85	385.54	186.32
15	23.50	25.00	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	239.97	239.97	5.65	66.55	496.17	1095.26	438.10	207.33
16	25.00	26.50	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	25.75	26.50	239.97	239.97	5.65	66.55	496.17	1161.81	464.73	228.34
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	239.97	239.97	5.65	71.31	624.75	1361.71	544.68	250.68
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	239.97	239.97	5.65	71.31	624.75	1433.01	573.21	273.02
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	239.97	239.97	1.88	23.77	624.75	1456.78	582.71	280.47

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.69E+03	4.07	2.46	1.90	1.80	7.75	7.31	0.128	0.513	15.61	3.90	60.45	28.54	37.46	9.36	145.08	68.49
2	22.50	20	2.96E+07	1.02E-01	2.85E+03	4.02	2.48	1.90	1.80	7.65	7.23	0.123	0.494	16.20	4.05	61.98	29.27	38.88	9.72	148.74	70.24
3	24.00	21	2.96E+07	1.02E-01	2.99E+03	3.99	2.51	1.90	1.80	7.58	7.16	0.120	0.479	16.69	4.17	63.21	29.86	40.05	10.01	151.71	71.66
4	25.50	22	2.96E+07	1.02E-01	3.11E+03	3.96	2.53	1.90	1.79	7.51	7.10	0.117	0.468	17.10	4.28	64.25	30.36	41.05	10.26	154.21	72.85
5	27.00	23	2.96E+07	1.02E-01	3.21E+03	3.93	2.54	1.90	1.79	7.46	7.05	0.115	0.459	17.44	4.36	65.10	30.76	41.86	10.46	156.24	73.83
6	28.50	23	2.96E+07	1.02E-01	3.29E+03	3.91	2.56	1.90	1.79	7.42	7.02	0.113	0.451	17.73	4.43	65.81	31.10	42.55	10.64	157.96	74.65
7	30.00	24	2.96E+07	1.02E-01	3.36E+03	3.89	2.57	1.90	1.79	7.39	6.99	0.111	0.445	17.96	4.49	66.38	31.37	43.10	10.78	159.31	75.30

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-82	-
Chainage	8+859	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.17	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-82	1.00	22.00	19.50	16.50	152.74	80.29	10.00	2.50
BH-82	1.00	23.50	21.00	18.00	162.46	88.75	10.20	2.55
BH-82	1.00	25.00	22.50	19.50	172.19	97.21	10.38	2.60
BH-82	1.00	26.50	24.00	21.00	181.91	105.66	10.53	2.63
BH-82	1.00	28.00	25.50	22.50	191.63	114.12	10.72	2.68
BH-82	1.00	29.50	27.00	24.00	201.36	122.57	11.03	2.76
BH-82	1.00	30.00	27.50	24.50	204.60	125.39	11.30	2.82

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.88	11.77	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.65	23.53	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.84	0.01	25	-	10.00	10.88	1.00	-	6.25	7.00	29.41	35.30	4.71	6.07	33.36	39.43	15.77	9.40
4	7.00	8.50	1.50	Granular	7.84	0.01	25	-	10.00	10.88	1.00	-	7.75	8.50	41.18	47.06	4.71	8.50	43.45	58.02	23.21	13.42
5	8.50	10.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	52.94	58.83	4.71	11.36	64.85	90.78	36.31	18.26
6	10.00	11.50	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	64.71	70.59	4.71	13.89	77.08	116.90	46.76	23.79
7	11.50	13.00	1.50	Granular	9.19	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	77.49	84.38	4.71	17.91	124.18	181.91	72.76	30.46
8	13.00	14.50	1.50	Granular	9.19	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	91.28	98.17	4.71	21.10	143.55	222.37	88.95	38.01
9	14.50	16.00	1.50	Granular	9.19	0.04	30	-	19.50	22.44	1.00	-	15.25	16.00	98.17	98.17	4.71	24.31	180.71	283.84	113.53	46.47
10	16.00	17.50	1.50	Granular	9.19	0.04	30	-	19.50	22.44	1.00	-	16.75	17.50	98.17	98.17	4.71	24.31	180.71	308.15	123.26	54.93
11	17.50	19.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	98.17	98.17	4.71	24.31	180.71	332.46	132.98	63.38
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	98.17	98.17	4.71	24.31	181.48	357.53	143.01	71.84
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	98.17	98.17	4.71	24.31	181.48	381.84	152.74	80.29
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	98.17	98.17	4.71	24.31	181.48	406.15	162.46	88.75
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	98.17	98.17	4.71	24.31	181.48	430.46	172.19	97.21
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	98.17	98.17	4.71	24.31	181.48	454.77	181.91	105.66
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	98.17	98.17	4.71	24.31	181.48	479.08	191.63	114.12
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	98.17	98.17	4.71	24.31	181.48	503.39	201.36	122.57
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	98.17	98.17	1.57	8.10	181.48	511.50	204.60	125.39

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.42E+03	3.60	1.53	1.96	1.82	7.05	6.53	0.200	0.800	10.00	2.50	35.24	16.33	24.01	6.00	84.57	39.19
2	22.50	18	2.96E+07	4.91E-02	2.49E+03	3.57	1.54	1.96	1.82	7.00	6.49	0.196	0.784	10.20	2.55	35.70	16.55	24.48	6.12	85.68	39.71
3	24.00	18	2.96E+07	4.91E-02	2.56E+03	3.55	1.55	1.96	1.82	6.96	6.45	0.193	0.771	10.38	2.60	36.12	16.74	24.91	6.23	86.69	40.19
4	25.50	18	2.96E+07	4.91E-02	2.62E+03	3.54	1.55	1.96	1.82	6.93	6.42	0.190	0.759	10.53	2.63	36.48	16.91	25.28	6.32	87.54	40.59
5	27.00	19	2.96E+07	4.91E-02	2.69E+03	3.52	1.56	1.96	1.81	6.88	6.39	0.187	0.746	10.72	2.68	36.91	17.12	25.73	6.43	88.58	41.08
6	28.50	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.181	0.725	11.03	2.76	37.62	17.45	26.48	6.62	90.29	41.89
7	30.00	21	2.96E+07	4.91E-02	2.92E+03	3.46	1.59	1.95	1.81	6.77	6.28	0.177	0.708	11.30	2.82	38.21	17.74	27.11	6.78	91.72	42.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-82	-
Chainage	8+100	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.75	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-82	1.20	22.00	19.50	16.50	242.82	111.34	12.99	3.25
BH-82	1.20	23.50	21.00	18.00	257.77	124.17	13.25	3.31
BH-82	1.20	25.00	22.50	19.50	272.71	137.01	13.48	3.37
BH-82	1.20	26.50	24.00	21.00	287.66	149.85	13.68	3.42
BH-82	1.20	28.00	25.50	22.50	302.61	162.69	13.93	3.48
BH-82	1.20	29.50	27.00	24.00	317.56	175.53	14.33	3.58
BH-82	1.20	30.00	27.50	24.50	322.54	179.81	14.67	3.67

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.88	11.77	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.65	23.53	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.84	0.01	25	-	10.00	10.88	1.00	-	6.25	7.00	29.41	35.30	5.65	7.28	48.93	56.21	22.48	13.12
4	7.00	8.50	1.50	Granular	7.84	0.01	25	-	10.00	10.88	1.00	-	7.75	8.50	41.18	47.06	5.65	10.20	63.46	80.94	32.38	18.35
5	8.50	10.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	52.94	58.83	5.65	13.63	94.44	125.55	50.22	24.55
6	10.00	11.50	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	64.71	70.59	5.65	16.66	112.05	159.83	63.93	31.59
7	11.50	13.00	1.50	Granular	9.19	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	77.49	84.38	5.65	21.49	180.46	249.73	99.89	39.98
8	13.00	14.50	1.50	Granular	9.19	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	91.28	98.17	5.65	25.31	208.35	302.93	121.17	49.44
9	14.50	16.00	1.50	Granular	9.19	0.04	30	-	19.50	22.44	1.00	-	15.25	16.00	105.07	111.96	5.65	31.22	297.38	423.18	169.27	60.56
10	16.00	17.50	1.50	Granular	9.19	0.04	30	-	19.50	22.44	1.00	-	16.75	17.50	118.86	125.75	5.65	35.32	332.50	493.62	197.45	72.82
11	17.50	19.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	125.75	125.75	5.65	37.37	332.50	530.99	212.40	85.66
12	19.00	20.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	125.75	125.75	5.65	37.37	333.83	569.68	227.87	98.50
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	125.75	125.75	5.65	37.37	333.83	607.05	242.82	111.34
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	125.75	125.75	5.65	37.37	333.83	644.42	257.77	124.17
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	125.75	125.75	5.65	37.37	333.83	681.79	272.71	137.01
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	125.75	125.75	5.65	37.37	333.83	719.15	287.66	149.85
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	125.75	125.75	5.65	37.37	333.83	756.52	302.61	162.69
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	125.75	125.75	5.65	37.37	333.83	793.89	317.56	175.53
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	125.75	125.75	1.88	12.46	333.83	806.34	322.54	179.81

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.42E+03	4.16	1.32	1.98	1.82	8.23	7.58	0.154	0.616	12.99	3.25	53.50	24.63	31.19	7.80	128.40	59.11
2	22.50	18	2.96E+07	1.02E-01	2.49E+03	4.14	1.33	1.98	1.82	8.18	7.53	0.151	0.604	13.25	3.31	54.20	24.96	31.80	7.95	130.08	59.90
3	24.00	18	2.96E+07	1.02E-01	2.56E+03	4.11	1.34	1.98	1.82	8.13	7.49	0.148	0.593	13.48	3.37	54.84	25.26	32.36	8.09	131.61	60.62
4	25.50	18	2.96E+07	1.02E-01	2.62E+03	4.09	1.34	1.98	1.82	8.09	7.46	0.146	0.585	13.68	3.42	55.38	25.51	32.84	8.21	132.90	61.22
5	27.00	19	2.96E+07	1.02E-01	2.69E+03	4.07	1.35	1.98	1.82	8.05	7.41	0.144	0.574	13.93	3.48	56.03	25.82	33.43	8.36	134.48	61.96
6	28.50	20	2.96E+07	1.02E-01	2.82E+03	4.03	1.36	1.98	1.82	7.97	7.35	0.140	0.558	14.33	3.58	57.12	26.33	34.40	8.60	137.08	63.19
7	30.00	21	2.96E+07	1.02E-01	2.92E+03	4.01	1.37	1.97	1.82	7.91	7.29	0.136	0.545	14.67	3.67	58.02	26.75	35.22	8.80	139.24	64.20

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-83	-
Chainage	8+793	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-83	1.00	22.00	19.50	16.50	158.26	82.16	11.99	3.00
BH-83	1.00	23.50	21.00	18.00	168.39	90.89	12.10	3.03
BH-83	1.00	25.00	22.50	19.50	178.51	99.63	12.39	3.10
BH-83	1.00	26.50	24.00	21.00	188.64	108.37	12.64	3.16
BH-83	1.00	28.00	25.50	22.50	198.76	117.10	12.84	3.21
BH-83	1.00	29.50	27.00	24.00	208.89	125.84	13.02	3.25
BH-83	1.00	30.00	27.50	24.50	212.26	128.75	13.16	3.29

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.88	11.77	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.65	23.53	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.41	35.30	4.71	6.31	40.38	46.69	18.68	9.46
4	7.00	8.50	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	41.18	47.06	4.71	8.84	52.61	67.76	27.10	13.59
5	8.50	10.00	1.50	Granular	9.19	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	53.96	60.85	4.71	11.58	67.59	94.31	37.73	18.48
6	10.00	11.50	1.50	Granular	9.19	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	67.75	74.64	4.71	14.54	81.92	123.19	49.28	24.20
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	81.54	88.43	4.71	18.84	129.87	189.98	75.99	31.13
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	95.33	102.22	4.71	22.03	149.24	231.38	92.55	38.94
9	14.50	16.00	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	15.25	16.00	102.22	102.22	4.71	25.31	188.64	296.09	118.44	47.68
10	16.00	17.50	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	16.75	17.50	102.22	102.22	4.71	25.31	188.64	321.41	128.56	56.42
11	17.50	19.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	102.22	102.22	4.71	24.47	169.25	326.48	130.59	64.92
12	19.00	20.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	102.22	102.22	4.71	24.47	169.25	350.95	140.38	73.42
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	102.22	102.22	4.71	25.31	188.64	395.66	158.26	82.16
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	102.22	102.22	4.71	25.31	188.64	420.97	168.39	90.89
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	102.22	102.22	4.71	25.31	188.64	446.28	178.51	99.63
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	102.22	102.22	4.71	25.31	188.64	471.60	188.64	108.37
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	102.22	102.22	4.71	25.31	188.64	496.91	198.76	117.10
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	102.22	102.22	4.71	25.31	188.64	522.22	208.89	125.84
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	102.22	102.22	1.57	8.44	188.64	530.66	212.26	128.75

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.667	11.99	3.00	39.77	18.47	28.78	7.20	95.45	44.34
2	22.50	23	2.96E+07	4.91E-02	3.25E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.661	12.10	3.03	40.01	18.59	29.04	7.26	96.02	44.61
3	24.00	24	2.96E+07	4.91E-02	3.37E+03	3.36	1.64	1.95	1.81	6.56	6.10	0.161	0.646	12.39	3.10	40.65	18.89	29.74	7.44	97.56	45.33
4	25.50	24	2.96E+07	4.91E-02	3.48E+03	3.34	1.65	1.95	1.81	6.52	6.06	0.158	0.633	12.64	3.16	41.19	19.15	30.34	7.58	98.85	45.95
5	27.00	25	2.96E+07	4.91E-02	3.57E+03	3.33	1.65	1.95	1.81	6.48	6.03	0.156	0.623	12.84	3.21	41.63	19.35	30.83	7.71	99.91	46.45
6	28.50	26	2.96E+07	4.91E-02	3.64E+03	3.31	1.66	1.95	1.81	6.45	6.00	0.154	0.615	13.02	3.25	42.01	19.53	31.24	7.81	100.81	46.88
7	30.00	26	2.96E+07	4.91E-02	3.71E+03	3.30	1.67	1.95	1.81	6.43	5.98	0.152	0.608	13.16	3.29	42.31	19.68	31.58	7.90	101.54	47.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-83	-
Chainage	8+793	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.80	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-83	1.20	22.00	19.50	16.50	254.38	114.40	15.58	3.90
BH-83	1.20	23.50	21.00	18.00	270.16	127.82	15.72	3.93
BH-83	1.20	25.00	22.50	19.50	285.95	141.25	16.10	4.02
BH-83	1.20	26.50	24.00	21.00	301.73	154.67	16.42	4.11
BH-83	1.20	28.00	25.50	22.50	317.52	168.10	16.69	4.17
BH-83	1.20	29.50	27.00	24.00	333.30	181.52	16.91	4.23
BH-83	1.20	30.00	27.50	24.50	338.57	186.00	17.10	4.27

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.88	11.77	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.65	23.53	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.41	35.30	5.65	7.57	59.21	66.78	26.71	13.20
4	7.00	8.50	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	41.18	47.06	5.65	10.60	76.82	95.00	38.00	18.55
5	8.50	10.00	1.50	Granular	9.19	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	53.96	60.85	5.65	13.90	98.56	130.64	52.26	24.81
6	10.00	11.50	1.50	Granular	9.19	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	67.75	74.64	5.65	17.45	119.21	168.73	67.49	32.07
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	81.54	88.43	5.65	22.61	188.65	260.79	104.31	40.78
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	95.33	102.22	5.65	26.44	216.54	315.11	126.04	50.56
9	14.50	16.00	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	15.25	16.00	109.87	117.51	5.65	32.65	312.84	444.06	177.62	62.08
10	16.00	17.50	1.50	Granular	10.19	0.03	30	-	19.50	22.44	1.00	-	16.75	17.50	125.16	132.80	5.65	37.19	351.78	520.19	208.08	74.86
11	17.50	19.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	132.80	132.80	5.65	38.15	315.62	522.17	208.87	87.92
12	19.00	20.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	132.80	132.80	5.65	38.15	315.62	560.32	224.13	100.98
13	20.50	22.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	132.80	132.80	5.65	39.46	351.78	635.95	254.38	114.40
14	22.00	23.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	132.80	132.80	5.65	39.46	351.78	675.41	270.16	127.82
15	23.50	25.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	132.80	132.80	5.65	39.46	351.78	714.87	285.95	141.25
16	25.00	26.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	132.80	132.80	5.65	39.46	351.78	754.34	301.73	154.67
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	132.80	132.80	5.65	39.46	351.78	793.80	317.52	168.10
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	132.80	132.80	5.65	39.46	351.78	833.26	333.30	181.52
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	132.80	132.80	1.88	13.15	351.78	846.41	338.57	186.00

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.58	3.90	60.38	27.87	37.39	9.35	144.92	66.88
2	22.50	23	2.96E+07	1.02E-01	3.25E+03	3.92	1.40	1.97	1.82	7.73	7.13	0.127	0.509	15.72	3.93	60.74	28.03	37.73	9.43	145.78	67.28
3	24.00	24	2.96E+07	1.02E-01	3.37E+03	3.89	1.41	1.97	1.82	7.67	7.08	0.124	0.497	16.10	4.02	61.71	28.49	38.64	9.66	148.11	68.38
4	25.50	24	2.96E+07	1.02E-01	3.48E+03	3.87	1.42	1.97	1.82	7.62	7.03	0.122	0.487	16.42	4.11	62.53	28.88	39.41	9.85	150.08	69.31
5	27.00	25	2.96E+07	1.02E-01	3.57E+03	3.85	1.43	1.97	1.82	7.58	7.00	0.120	0.479	16.69	4.17	63.20	29.20	40.05	10.01	151.69	70.07
6	28.50	26	2.96E+07	1.02E-01	3.64E+03	3.83	1.44	1.97	1.82	7.54	6.97	0.118	0.473	16.91	4.23	63.78	29.47	40.59	10.15	153.06	70.72
7	30.00	26	2.96E+07	1.02E-01	3.71E+03	3.82	1.44	1.97	1.82	7.51	6.95	0.117	0.468	17.10	4.27	64.23	29.68	41.03	10.26	154.16	71.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-84	-
Chainage	8+939	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	96.75	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-84	1.00	22.00	19.50	13.50	144.34	75.12	11.87	2.97
BH-84	1.00	23.50	21.00	15.00	153.92	83.48	12.16	3.04
BH-84	1.00	25.00	22.50	16.50	163.50	91.83	12.50	3.13
BH-84	1.00	26.50	24.00	18.00	173.09	100.19	12.79	3.20
BH-84	1.00	28.00	25.50	19.50	182.67	108.55	13.03	3.26
BH-84	1.00	29.50	27.00	21.00	192.25	116.90	13.22	3.31
BH-84	1.00	30.00	27.50	21.50	195.44	119.69	13.38	3.34

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.69	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	15.06	20.08	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	25.96	31.85	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	37.73	43.61	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	49.49	55.38	4.71	10.62	61.26	71.88	28.75	13.97
6	10.00	11.50	1.50	Granular	9.19	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	62.27	69.17	4.71	13.36	76.23	100.22	40.09	19.36
7	11.50	13.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	76.06	82.96	4.71	18.21	137.99	180.18	72.07	26.11
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	89.85	96.75	4.71	21.51	159.87	223.57	89.43	33.78
9	14.50	16.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	15.25	16.00	96.75	96.75	4.71	23.16	160.56	247.42	98.97	41.91
10	16.00	17.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	96.75	96.75	4.71	23.16	160.56	270.58	108.23	50.05
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	96.75	96.75	4.71	23.96	178.95	312.93	125.17	58.40
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	96.75	96.75	4.71	23.96	178.95	336.89	134.75	66.76
13	20.50	22.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	96.75	96.75	4.71	23.96	178.95	360.84	144.34	75.12
14	22.00	23.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	96.75	96.75	4.71	23.96	178.95	384.80	153.92	83.48
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	96.75	96.75	4.71	23.96	178.95	408.76	163.50	91.83
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	96.75	96.75	4.71	23.96	178.95	432.71	173.09	100.19
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	96.75	96.75	4.71	23.96	178.95	456.67	182.67	108.55
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	96.75	96.75	4.71	23.96	178.95	480.63	192.25	116.90
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	96.75	96.75	1.57	7.99	178.95	488.61	195.44	119.69

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.78E+03	3.50	2.43	1.90	1.80	6.65	6.28	0.168	0.674	11.87	2.97	39.51	18.64	28.50	7.12	94.82	44.74
2	22.50	20	2.96E+07	4.91E-02	2.88E+03	3.47	2.45	1.90	1.80	6.60	6.23	0.165	0.658	12.16	3.04	40.13	18.94	29.18	7.29	96.32	45.47
3	24.00	21	2.96E+07	4.91E-02	3.01E+03	3.44	2.47	1.90	1.80	6.54	6.18	0.160	0.640	12.50	3.13	40.89	19.30	30.00	7.50	98.13	46.33
4	25.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	2.49	1.90	1.80	6.49	6.13	0.156	0.625	12.79	3.20	41.52	19.61	30.70	7.67	99.64	47.05
5	27.00	23	2.96E+07	4.91E-02	3.22E+03	3.40	2.50	1.90	1.80	6.45	6.09	0.154	0.614	13.03	3.26	42.02	19.85	31.26	7.82	100.86	47.64
6	28.50	23	2.96E+07	4.91E-02	3.30E+03	3.38	2.52	1.90	1.79	6.42	6.07	0.151	0.605	13.22	3.31	42.45	20.05	31.74	7.93	101.88	48.13
7	30.00	24	2.96E+07	4.91E-02	3.36E+03	3.37	2.52	1.90	1.79	6.40	6.04	0.150	0.598	13.38	3.34	42.78	20.21	32.11	8.03	102.66	48.50

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-84	-
Chainage	8+939	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	127.33	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-84	1.20	22.00	19.50	13.50	236.86	106.04	15.51	3.88
BH-84	1.20	23.50	21.00	15.00	251.99	119.01	15.88	3.97
BH-84	1.20	25.00	22.50	16.50	267.13	131.98	16.33	4.08
BH-84	1.20	26.50	24.00	18.00	282.26	144.95	16.72	4.18
BH-84	1.20	28.00	25.50	19.50	297.40	157.92	17.03	4.26
BH-84	1.20	29.50	27.00	21.00	312.53	170.89	17.29	4.32
BH-84	1.20	30.00	27.50	21.50	317.57	175.21	17.49	4.37

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.69	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	15.06	20.08	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	25.96	31.85	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	37.73	43.61	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	9.25	10.00	49.49	55.38	5.65	12.75	89.27	102.02	40.81	19.40
6	10.00	11.50	1.50	Granular	9.19	0.03	26	-	11.90	13.19	1.00	-	10.75	11.50	62.27	69.17	5.65	16.04	111.02	139.80	55.92	26.27
7	11.50	13.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	76.06	82.96	5.65	21.85	200.54	251.17	100.47	34.76
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	89.85	96.75	5.65	25.81	232.05	308.49	123.39	44.36
9	14.50	16.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	15.25	16.00	104.39	112.04	5.65	29.99	268.18	374.60	149.84	55.13
10	16.00	17.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	119.68	127.33	5.65	34.38	303.11	443.91	177.56	67.13
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	127.33	127.33	5.65	37.84	337.84	516.48	206.59	80.10
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	127.33	127.33	5.65	37.84	337.84	554.31	221.73	93.07
13	20.50	22.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	127.33	127.33	5.65	37.84	337.84	592.15	236.86	106.04
14	22.00	23.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	127.33	127.33	5.65	37.84	337.84	629.98	251.99	119.01
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	127.33	127.33	5.65	37.84	337.84	667.82	267.13	131.98
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	127.33	127.33	5.65	37.84	337.84	705.65	282.26	144.95
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	127.33	127.33	5.65	37.84	337.84	743.49	297.40	157.92
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	127.33	127.33	5.65	37.84	337.84	781.33	312.53	170.89
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	127.33	127.33	1.88	12.61	337.84	793.94	317.57	175.21

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.78E+03	4.05	2.10	1.92	1.80	7.76	7.29	0.129	0.516	15.51	3.88	60.19	28.26	37.22	9.30	144.46	67.83
2	22.50	20	2.96E+07	1.02E-01	2.88E+03	4.02	2.12	1.92	1.80	7.70	7.23	0.126	0.504	15.88	3.97	61.16	28.72	38.11	9.53	146.77	68.94
3	24.00	21	2.96E+07	1.02E-01	3.01E+03	3.98	2.14	1.92	1.80	7.63	7.17	0.122	0.490	16.33	4.08	62.31	29.28	39.20	9.80	149.55	70.26
4	25.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	2.15	1.92	1.80	7.57	7.12	0.120	0.479	16.72	4.18	63.28	29.74	40.12	10.03	151.88	71.38
5	27.00	23	2.96E+07	1.02E-01	3.22E+03	3.93	2.16	1.92	1.80	7.53	7.07	0.117	0.470	17.03	4.26	64.06	30.11	40.86	10.22	153.75	72.27
6	28.50	23	2.96E+07	1.02E-01	3.30E+03	3.91	2.17	1.91	1.80	7.49	7.04	0.116	0.463	17.29	4.32	64.72	30.43	41.49	10.37	155.32	73.02
7	30.00	24	2.96E+07	1.02E-01	3.36E+03	3.90	2.18	1.91	1.80	7.46	7.01	0.114	0.457	17.49	4.37	65.22	30.67	41.97	10.49	156.52	73.60

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-85	-
Chainage	9+024	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	102.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-85	1.00	22.00	19.50	16.50	158.85	82.56	11.33	2.83
BH-85	1.00	23.50	21.00	18.00	168.97	91.30	11.48	2.87
BH-85	1.00	25.00	22.50	19.50	179.10	100.04	11.64	2.91
BH-85	1.00	26.50	24.00	21.00	189.22	108.78	11.91	2.98
BH-85	1.00	28.00	25.50	22.50	199.35	117.51	12.12	3.03
BH-85	1.00	29.50	27.00	24.00	209.47	126.25	12.30	3.08
BH-85	1.00	30.00	27.50	24.50	212.85	129.16	12.44	3.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.88	11.77	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.65	23.53	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.41	35.30	4.71	6.31	40.38	46.69	18.68	9.46
4	7.00	8.50	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	41.18	47.06	4.71	8.84	52.61	67.76	27.10	13.59
5	8.50	10.00	1.50	Granular	9.19	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	53.96	60.85	4.71	11.58	67.59	94.31	37.73	18.48
6	10.00	11.50	1.50	Granular	9.19	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	67.75	74.64	4.71	14.54	81.92	123.19	49.28	24.20
7	11.50	13.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	81.54	88.43	4.71	19.52	146.67	207.46	82.98	31.31
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	95.33	102.22	4.71	22.82	168.55	252.16	100.86	39.35
9	14.50	16.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	15.25	16.00	102.22	102.22	4.71	24.47	169.25	277.32	110.93	47.85
10	16.00	17.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	102.22	102.22	4.71	24.47	169.25	301.79	120.72	56.35
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	102.22	102.22	4.71	25.31	188.64	346.49	138.60	65.09
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	102.22	102.22	4.71	25.31	188.64	371.81	148.72	73.83
13	20.50	22.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	102.22	102.22	4.71	25.31	188.64	397.12	158.85	82.56
14	22.00	23.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	102.22	102.22	4.71	25.31	188.64	422.43	168.97	91.30
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	102.22	102.22	4.71	25.31	188.64	447.74	179.10	100.04
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	102.22	102.22	4.71	25.31	188.64	473.06	189.22	108.78
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	102.22	102.22	4.71	25.31	188.64	498.37	199.35	117.51
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	102.22	102.22	4.71	25.31	188.64	523.68	209.47	126.25
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	102.22	102.22	1.57	8.44	188.64	532.12	212.85	129.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.93E+03	3.46	1.59	1.95	1.81	6.76	6.27	0.177	0.706	11.33	2.83	38.29	17.77	27.19	6.80	91.89	42.65
2	22.50	21	2.96E+07	4.91E-02	3.00E+03	3.44	1.60	1.95	1.81	6.73	6.25	0.174	0.697	11.48	2.87	38.63	17.93	27.56	6.89	92.72	43.04
3	24.00	22	2.96E+07	4.91E-02	3.06E+03	3.43	1.60	1.95	1.81	6.70	6.22	0.172	0.687	11.64	2.91	39.00	18.11	27.95	6.99	93.59	43.46
4	25.50	22	2.96E+07	4.91E-02	3.17E+03	3.41	1.62	1.95	1.81	6.65	6.18	0.168	0.672	11.91	2.98	39.59	18.39	28.58	7.15	95.01	44.12
5	27.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.660	12.12	3.03	40.06	18.61	29.10	7.27	96.14	44.66
6	28.50	23	2.96E+07	4.91E-02	3.34E+03	3.37	1.63	1.95	1.81	6.58	6.11	0.163	0.650	12.30	3.08	40.45	18.80	29.53	7.38	97.09	45.11
7	30.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	1.64	1.95	1.81	6.55	6.09	0.161	0.643	12.44	3.11	40.76	18.94	29.86	7.47	97.82	45.46

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-85	-
Chainage	9+024	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.80	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-85	1.20	22.00	19.50	16.50	255.20	114.98	14.72	3.68
BH-85	1.20	23.50	21.00	18.00	270.99	128.40	14.92	3.73
BH-85	1.20	25.00	22.50	19.50	286.77	141.82	15.13	3.78
BH-85	1.20	26.50	24.00	21.00	302.56	155.25	15.47	3.87
BH-85	1.20	28.00	25.50	22.50	318.34	168.67	15.75	3.94
BH-85	1.20	29.50	27.00	24.00	334.13	182.10	15.98	4.00
BH-85	1.20	30.00	27.50	24.50	339.39	186.57	16.16	4.04

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.88	11.77	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.84	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.65	23.53	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.41	35.30	5.65	7.57	59.21	66.78	26.71	13.20
4	7.00	8.50	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	41.18	47.06	5.65	10.60	76.82	95.00	38.00	18.55
5	8.50	10.00	1.50	Granular	9.19	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	53.96	60.85	5.65	13.90	98.56	130.64	52.26	24.81
6	10.00	11.50	1.50	Granular	9.19	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	67.75	74.64	5.65	17.45	119.21	168.73	67.49	32.07
7	11.50	13.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	81.54	88.43	5.65	23.42	213.05	285.99	114.40	41.01
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	95.33	102.22	5.65	27.38	244.55	344.88	137.95	51.05
9	14.50	16.00	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	15.25	16.00	109.87	117.51	5.65	31.56	280.68	412.57	165.03	62.26
10	16.00	17.50	1.50	Granular	10.19	0.07	29	-	17.60	20.13	1.00	-	16.75	17.50	125.16	132.80	5.65	35.95	315.62	483.45	193.38	74.70
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	132.80	132.80	5.65	39.46	351.78	559.08	223.63	88.13
12	19.00	20.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	132.80	132.80	5.65	39.46	351.78	598.54	239.42	101.55
13	20.50	22.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	132.80	132.80	5.65	39.46	351.78	638.00	255.20	114.98
14	22.00	23.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	132.80	132.80	5.65	39.46	351.78	677.47	270.99	128.40
15	23.50	25.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	132.80	132.80	5.65	39.46	351.78	716.93	286.77	141.82
16	25.00	26.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	132.80	132.80	5.65	39.46	351.78	756.39	302.56	155.25
17	26.50	28.00	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	132.80	132.80	5.65	39.46	351.78	795.85	318.34	168.67
18	28.00	29.50	1.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	132.80	132.80	5.65	39.46	351.78	835.32	334.13	182.10
19	29.50	30.00	0.50	Granular	10.19	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	132.80	132.80	1.88	13.15	351.78	848.47	339.39	186.57

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.37	1.97	1.82	7.90	7.29	0.136	0.544	14.72	3.68	58.13	26.80	35.32	8.83	139.51	64.33
2	22.50	21	2.96E+07	1.02E-01	3.00E+03	3.99	1.38	1.97	1.82	7.86	7.25	0.134	0.536	14.92	3.73	58.65	27.05	35.80	8.95	140.77	64.92
3	24.00	22	2.96E+07	1.02E-01	3.06E+03	3.97	1.39	1.97	1.82	7.83	7.22	0.132	0.529	15.13	3.78	59.21	27.31	36.31	9.08	142.09	65.55
4	25.50	22	2.96E+07	1.02E-01	3.17E+03	3.94	1.40	1.97	1.82	7.77	7.17	0.129	0.517	15.47	3.87	60.10	27.73	37.13	9.28	144.24	66.56
5	27.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.508	15.75	3.94	60.82	28.07	37.80	9.45	145.96	67.37
6	28.50	23	2.96E+07	1.02E-01	3.34E+03	3.90	1.41	1.97	1.82	7.69	7.10	0.125	0.501	15.98	4.00	61.42	28.35	38.36	9.59	147.41	68.05
7	30.00	24	2.96E+07	1.02E-01	3.40E+03	3.89	1.42	1.97	1.82	7.66	7.07	0.124	0.495	16.16	4.04	61.88	28.57	38.79	9.70	148.51	68.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-86	-
Chainage	9+115	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	106.65	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-86	1.00	22.00	19.50	12.00	151.42	75.17	10.66	2.66
BH-86	1.00	23.50	21.00	13.50	161.98	84.22	10.90	2.73
BH-86	1.00	25.00	22.50	15.00	172.54	93.26	11.19	2.80
BH-86	1.00	26.50	24.00	16.50	183.11	102.30	11.61	2.90
BH-86	1.00	28.00	25.50	18.00	193.67	111.35	11.96	2.99
BH-86	1.00	29.50	27.00	19.50	204.23	120.39	12.26	3.07
BH-86	1.00	30.00	27.50	20.00	207.75	123.40	12.50	3.13

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	5.88	11.77	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.84	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	17.65	23.53	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.41	35.30	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	9.59	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	42.49	49.69	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	56.88	64.08	4.71	0.00	0.00	0.00	0.00	11.00
6	10.00	11.50	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	71.27	78.47	4.71	15.30	86.09	101.38	40.55	16.93
7	11.50	13.00	1.50	Granular	9.59	0.10	25	-	10.00	10.88	1.00	-	12.25	13.00	85.66	92.86	4.71	17.68	83.41	116.38	46.55	23.53
8	13.00	14.50	1.50	Granular	9.19	0.10	25	-	10.00	10.88	1.00	-	13.75	14.50	99.75	106.65	4.71	20.58	95.08	148.64	59.45	30.94
9	14.50	16.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	106.65	106.65	4.71	25.53	175.57	254.66	101.86	39.74
10	16.00	17.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	106.65	106.65	4.71	25.53	175.57	280.19	112.07	48.53
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	106.65	106.65	4.71	25.53	176.27	306.41	122.56	57.33
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	106.65	106.65	4.71	25.53	176.27	331.94	132.77	66.13
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	106.65	106.65	4.71	26.41	196.47	378.54	151.42	75.17
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	106.65	106.65	4.71	26.41	196.47	404.95	161.98	84.22
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	106.65	106.65	4.71	26.41	196.47	431.36	172.54	93.26
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	106.65	106.65	4.71	26.41	196.47	457.77	183.11	102.30
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	106.65	106.65	4.71	26.41	196.47	484.18	193.67	111.35
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	106.65	106.65	4.71	26.41	196.47	510.58	204.23	120.39
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	106.65	106.65	1.57	8.80	196.47	519.39	207.75	123.40

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.25E+03	3.65	2.74	1.89	1.79	6.90	6.53	0.188	0.751	10.66	2.66	36.76	17.40	25.57	6.39	88.21	41.76
2	22.50	17	2.96E+07	4.91E-02	2.34E+03	3.62	2.76	1.89	1.79	6.85	6.48	0.183	0.734	10.90	2.73	37.32	17.67	26.17	6.54	89.57	42.41
3	24.00	17	2.96E+07	4.91E-02	2.44E+03	3.59	2.79	1.89	1.79	6.79	6.43	0.179	0.715	11.19	2.80	37.97	17.98	26.86	6.71	91.14	43.16
4	25.50	18	2.96E+07	4.91E-02	2.59E+03	3.55	2.82	1.89	1.79	6.70	6.35	0.172	0.689	11.61	2.90	38.92	18.44	27.87	6.97	93.42	44.25
5	27.00	19	2.96E+07	4.91E-02	2.71E+03	3.51	2.85	1.89	1.79	6.64	6.29	0.167	0.669	11.96	2.99	39.70	18.81	28.71	7.18	95.28	45.15
6	28.50	20	2.96E+07	4.91E-02	2.82E+03	3.49	2.87	1.89	1.79	6.58	6.24	0.163	0.653	12.26	3.07	40.36	19.12	29.42	7.36	96.86	45.90
7	30.00	21	2.96E+07	4.91E-02	2.91E+03	3.46	2.89	1.89	1.79	6.54	6.20	0.160	0.640	12.50	3.13	40.89	19.38	30.01	7.50	98.14	46.51

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-86	-
Chainage	9+115	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	134.23	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-86	1.20	22.00	19.50	12.00	242.35	104.96	13.97	3.49
BH-86	1.20	23.50	21.00	13.50	258.30	118.50	14.30	3.57
BH-86	1.20	25.00	22.50	15.00	274.26	132.05	14.68	3.67
BH-86	1.20	26.50	24.00	16.50	290.21	145.59	15.24	3.81
BH-86	1.20	28.00	25.50	18.00	306.16	159.13	15.70	3.93
BH-86	1.20	29.50	27.00	19.50	322.12	172.68	16.10	4.03
BH-86	1.20	30.00	27.50	20.00	327.44	177.19	16.42	4.11

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	5.88	11.77	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.84	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	17.65	23.53	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	29.41	35.30	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	9.59	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	42.49	49.69	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	56.88	64.08	5.65	0.00	0.00	0.00	0.00	15.83
6	10.00	11.50	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	71.27	78.47	5.65	18.35	125.26	143.62	57.45	23.35
7	11.50	13.00	1.50	Granular	9.59	0.10	25	-	10.00	10.88	1.00	-	12.25	13.00	85.66	92.86	5.65	21.21	121.20	160.77	64.31	31.66
8	13.00	14.50	1.50	Granular	9.19	0.10	25	-	10.00	10.88	1.00	-	13.75	14.50	99.75	106.65	5.65	24.70	137.96	202.23	80.89	40.95
9	14.50	16.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	113.54	120.44	5.65	32.61	286.17	383.05	153.22	52.46
10	16.00	17.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	127.33	134.23	5.65	36.58	317.67	451.13	180.45	65.08
11	17.50	19.00	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	134.23	134.23	5.65	38.56	318.87	490.88	196.35	78.25
12	19.00	20.50	1.50	Granular	10.19	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	134.23	134.23	5.65	38.56	318.87	529.44	211.78	91.42
13	20.50	22.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	134.23	134.23	5.65	39.89	355.41	605.87	242.35	104.96
14	22.00	23.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	134.23	134.23	5.65	39.89	355.41	645.75	258.30	118.50
15	23.50	25.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	134.23	134.23	5.65	39.89	355.41	685.64	274.26	132.05
16	25.00	26.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	134.23	134.23	5.65	39.89	355.41	725.53	290.21	145.59
17	26.50	28.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	134.23	134.23	5.65	39.89	355.41	765.41	306.16	159.13
18	28.00	29.50	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	134.23	134.23	5.65	39.89	355.41	805.30	322.12	172.68
19	29.50	30.00	0.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	134.23	134.23	1.88	13.30	355.41	818.59	327.44	177.19

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.25E+03	4.22	2.37	1.91	1.80	8.04	7.58	0.143	0.573	13.97	3.49	56.14	26.47	33.53	8.38	134.74	63.54
2	22.50	17	2.96E+07	1.02E-01	2.34E+03	4.19	2.39	1.90	1.80	7.98	7.52	0.140	0.560	14.30	3.57	57.02	26.89	34.31	8.58	136.85	64.54
3	24.00	17	2.96E+07	1.02E-01	2.44E+03	4.15	2.41	1.90	1.80	7.91	7.46	0.136	0.545	14.68	3.67	58.03	27.38	35.23	8.81	139.27	65.70
4	25.50	18	2.96E+07	1.02E-01	2.59E+03	4.10	2.44	1.90	1.80	7.81	7.37	0.131	0.525	15.24	3.81	59.50	28.08	36.58	9.14	142.80	67.39
5	27.00	19	2.96E+07	1.02E-01	2.71E+03	4.06	2.46	1.90	1.80	7.73	7.30	0.127	0.509	15.70	3.93	60.70	28.66	37.69	9.42	145.68	68.77
6	28.50	20	2.96E+07	1.02E-01	2.82E+03	4.03	2.48	1.90	1.80	7.67	7.24	0.124	0.497	16.10	4.03	61.72	29.14	38.64	9.66	148.13	69.94
7	30.00	21	2.96E+07	1.02E-01	2.91E+03	4.01	2.50	1.90	1.80	7.62	7.19	0.122	0.487	16.42	4.11	62.54	29.54	39.42	9.85	150.10	70.89

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-87	-
Chainage	9+244	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	89.62	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-87	1.00	22.00	19.50	15.00	137.55	74.11	11.38	2.84
BH-87	1.00	23.50	21.00	16.50	146.43	81.98	11.53	2.88
BH-87	1.00	25.00	22.50	18.00	155.31	89.84	11.90	2.98
BH-87	1.00	26.50	24.00	19.50	164.19	97.70	12.21	3.05
BH-87	1.00	28.00	25.50	21.00	173.06	105.57	12.47	3.12
BH-87	1.00	29.50	27.00	22.50	181.94	113.43	12.69	3.17
BH-87	1.00	30.00	27.50	23.00	184.90	116.05	12.86	3.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.64	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.73	11.47	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.64	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.20	22.93	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.64	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	28.66	34.40	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.64	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	40.13	45.86	4.71	8.61	51.27	59.88	23.95	11.76
5	8.50	10.00	1.50	Granular	7.29	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	51.33	56.80	4.71	11.44	73.38	93.43	37.37	16.61
6	10.00	11.50	1.50	Granular	7.29	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	62.27	67.74	4.71	13.88	86.75	120.68	48.27	22.15
7	11.50	13.00	1.50	Granular	7.29	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	73.21	78.68	4.71	16.92	115.00	165.85	66.34	28.53
8	13.00	14.50	1.50	Granular	7.29	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	84.15	89.62	4.71	19.45	130.37	200.67	80.27	35.63
9	14.50	16.00	1.50	Granular	7.29	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	89.62	89.62	4.71	21.45	147.25	239.00	95.60	43.28
10	16.00	17.50	1.50	Granular	7.29	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	89.62	89.62	4.71	21.45	147.25	260.45	104.18	50.94
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	89.62	89.62	4.71	21.45	148.56	283.22	113.29	58.60
12	19.00	20.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	89.62	89.62	4.71	21.45	148.56	304.67	121.87	66.25
13	20.50	22.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	89.62	89.62	4.71	22.19	165.58	343.89	137.55	74.11
14	22.00	23.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	89.62	89.62	4.71	22.19	165.58	366.08	146.43	81.98
15	23.50	25.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	89.62	89.62	4.71	22.19	165.58	388.27	155.31	89.84
16	25.00	26.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	89.62	89.62	4.71	22.19	165.58	410.46	164.19	97.70
17	26.50	28.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	89.62	89.62	4.71	22.19	165.58	432.66	173.06	105.57
18	28.00	29.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	89.62	89.62	4.71	22.19	165.58	454.85	181.94	113.43
19	29.50	30.00	0.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	89.62	89.62	1.57	7.40	165.58	462.25	184.90	116.05

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.74E+03	3.51	2.00	1.93	1.80	6.75	6.33	0.176	0.703	11.38	2.84	38.40	17.99	27.31	6.83	92.15	43.18
2	22.50	20	2.96E+07	4.91E-02	2.80E+03	3.49	2.00	1.92	1.80	6.72	6.30	0.173	0.694	11.53	2.88	38.75	18.16	27.68	6.92	93.00	43.59
3	24.00	21	2.96E+07	4.91E-02	2.94E+03	3.46	2.02	1.92	1.80	6.65	6.24	0.168	0.672	11.90	2.98	39.57	18.55	28.56	7.14	94.96	44.53
4	25.50	22	2.96E+07	4.91E-02	3.06E+03	3.43	2.04	1.92	1.80	6.59	6.18	0.164	0.655	12.21	3.05	40.25	18.88	29.31	7.33	96.61	45.31
5	27.00	22	2.96E+07	4.91E-02	3.16E+03	3.41	2.05	1.92	1.80	6.55	6.14	0.160	0.642	12.47	3.12	40.81	19.15	29.92	7.48	97.96	45.96
6	28.50	23	2.96E+07	4.91E-02	3.25E+03	3.39	2.07	1.92	1.80	6.51	6.11	0.158	0.631	12.69	3.17	41.29	19.37	30.45	7.61	99.09	46.50
7	30.00	23	2.96E+07	4.91E-02	3.32E+03	3.37	2.07	1.92	1.80	6.48	6.08	0.156	0.622	12.86	3.22	41.67	19.55	30.86	7.72	100.00	46.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-87	-
Chainage	9+244	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	111.50	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-87	1.20	22.00	19.50	15.00	214.21	101.84	14.80	3.70
BH-87	1.20	23.50	21.00	16.50	227.46	113.50	15.01	3.75
BH-87	1.20	25.00	22.50	18.00	240.72	125.15	15.48	3.87
BH-87	1.20	26.50	24.00	19.50	253.97	136.80	15.89	3.97
BH-87	1.20	28.00	25.50	21.00	267.22	148.45	16.23	4.06
BH-87	1.20	29.50	27.00	22.50	280.47	160.10	16.51	4.13
BH-87	1.20	30.00	27.50	23.00	284.89	163.99	16.74	4.18

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.64	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.73	11.47	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.64	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	17.20	22.93	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.64	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	28.66	34.40	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.64	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	40.13	45.86	5.65	10.33	74.86	85.20	34.08	16.35
5	8.50	10.00	1.50	Granular	7.29	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	51.33	56.80	5.65	13.73	106.81	130.87	52.35	22.57
6	10.00	11.50	1.50	Granular	7.29	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	62.27	67.74	5.65	16.65	126.06	166.78	66.71	29.61
7	11.50	13.00	1.50	Granular	7.29	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	73.21	78.68	5.65	20.30	166.90	227.92	91.17	37.67
8	13.00	14.50	1.50	Granular	7.29	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	84.15	89.62	5.65	23.34	189.03	273.39	109.35	46.58
9	14.50	16.00	1.50	Granular	7.29	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	95.09	100.56	5.65	27.31	238.48	350.16	140.06	56.60
10	16.00	17.50	1.50	Granular	7.29	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	106.03	111.50	5.65	30.46	263.48	405.61	162.24	67.51
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	111.50	111.50	5.65	32.03	265.75	439.91	175.97	78.85
12	19.00	20.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	111.50	111.50	5.65	32.03	265.75	471.94	188.78	90.19
13	20.50	22.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	111.50	111.50	5.65	33.13	296.20	535.52	214.21	101.84
14	22.00	23.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	111.50	111.50	5.65	33.13	296.20	568.66	227.46	113.50
15	23.50	25.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	111.50	111.50	5.65	33.13	296.20	601.79	240.72	125.15
16	25.00	26.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	111.50	111.50	5.65	33.13	296.20	634.92	253.97	136.80
17	26.50	28.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	111.50	111.50	5.65	33.13	296.20	668.05	267.22	148.45
18	28.00	29.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	111.50	111.50	5.65	33.13	296.20	701.19	280.47	160.10
19	29.50	30.00	0.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	111.50	111.50	1.88	11.04	296.20	712.23	284.89	163.99

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.74E+03	4.06	1.73	1.94	1.81	7.88	7.35	0.135	0.541	14.80	3.70	58.35	27.18	35.52	8.88	140.04	65.23
2	22.50	20	2.96E+07	1.02E-01	2.80E+03	4.04	1.73	1.94	1.81	7.85	7.31	0.133	0.533	15.01	3.75	58.89	27.43	36.01	9.00	141.33	65.84
3	24.00	21	2.96E+07	1.02E-01	2.94E+03	4.00	1.75	1.94	1.81	7.77	7.24	0.129	0.517	15.48	3.87	60.13	28.03	37.16	9.29	144.32	67.26
4	25.50	22	2.96E+07	1.02E-01	3.06E+03	3.97	1.76	1.94	1.81	7.70	7.18	0.126	0.503	15.89	3.97	61.18	28.53	38.14	9.53	146.84	68.46
5	27.00	22	2.96E+07	1.02E-01	3.16E+03	3.94	1.78	1.94	1.81	7.65	7.13	0.123	0.493	16.23	4.06	62.04	28.93	38.94	9.74	148.89	69.44
6	28.50	23	2.96E+07	1.02E-01	3.25E+03	3.92	1.79	1.94	1.81	7.60	7.09	0.121	0.485	16.51	4.13	62.76	29.28	39.63	9.91	150.63	70.26
7	30.00	23	2.96E+07	1.02E-01	3.32E+03	3.90	1.79	1.94	1.81	7.57	7.06	0.119	0.478	16.74	4.18	63.34	29.55	40.17	10.04	152.01	70.92

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-88	-
Chainage	9+346	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.55	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-88	1.00	22.00	19.50	12.00	140.52	71.77	11.26	2.81
BH-88	1.00	23.50	21.00	13.50	150.28	80.25	11.76	2.94
BH-88	1.00	25.00	22.50	15.00	160.04	88.74	12.17	3.04
BH-88	1.00	26.50	24.00	16.50	170.11	97.22	12.52	3.13
BH-88	1.00	28.00	25.50	18.00	179.87	105.70	12.80	3.20
BH-88	1.00	29.50	27.00	19.50	189.63	114.18	13.05	3.26
BH-88	1.00	30.00	27.50	20.00	192.89	117.01	13.25	3.31

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.69	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	15.06	20.08	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.84	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	25.96	31.85	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.84	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	37.73	43.61	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	7.84	0.00	26	-	11.90	13.19	1.00	-	9.25	10.00	49.49	55.38	4.71	0.00	0.00	0.00	0.00	11.00
6	10.00	11.50	1.50	Granular	9.59	0.00	26	-	11.90	13.19	1.00	-	10.75	11.50	62.57	69.77	4.71	13.43	77.04	90.47	36.19	16.40
7	11.50	13.00	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	76.96	84.16	4.71	16.52	92.01	121.95	48.78	22.68
8	13.00	14.50	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	91.35	98.55	4.71	19.60	106.97	156.52	62.61	29.82
9	14.50	16.00	1.50	Granular	9.59	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	98.55	98.55	4.71	23.59	163.00	236.14	94.46	38.07
10	16.00	17.50	1.50	Granular	9.59	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	98.55	98.55	4.71	23.59	163.00	259.73	103.89	46.33
11	17.50	19.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	98.55	98.55	4.71	24.40	181.37	302.50	121.00	54.81
12	19.00	20.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	98.55	98.55	4.71	24.40	181.37	326.90	130.76	63.29
13	20.50	22.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	98.55	98.55	4.71	24.40	181.37	351.31	140.52	71.77
14	22.00	23.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	98.55	98.55	4.71	24.40	181.37	375.71	150.28	80.25
15	23.50	25.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	98.55	98.55	4.71	24.40	181.37	400.11	160.04	88.74
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	98.55	98.55	4.71	24.40	182.14	425.28	170.11	97.22
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	98.55	98.55	4.71	24.40	182.14	449.68	179.87	105.70
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	98.55	98.55	4.71	24.40	182.14	474.09	189.63	114.18
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	98.55	98.55	1.57	8.13	182.14	482.22	192.89	117.01

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_r/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.46E+03	3.58	2.79	1.89	1.79	6.77	6.42	0.178	0.711	11.26	2.81	38.13	18.06	27.02	6.75	91.50	43.34
2	22.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	2.83	1.89	1.79	6.68	6.33	0.170	0.680	11.76	2.94	39.25	18.59	28.22	7.05	94.20	44.63
3	24.00	20	2.96E+07	4.91E-02	2.79E+03	3.49	2.86	1.89	1.79	6.60	6.25	0.164	0.657	12.17	3.04	40.16	19.03	29.21	7.30	96.38	45.67
4	25.50	21	2.96E+07	4.91E-02	2.92E+03	3.46	2.89	1.89	1.79	6.54	6.20	0.160	0.639	12.52	3.13	40.92	19.39	30.04	7.51	98.21	46.55
5	27.00	21	2.96E+07	4.91E-02	3.03E+03	3.44	2.91	1.89	1.79	6.49	6.15	0.156	0.625	12.80	3.20	41.55	19.69	30.73	7.68	99.71	47.26
6	28.50	22	2.96E+07	4.91E-02	3.12E+03	3.42	2.93	1.89	1.79	6.45	6.11	0.153	0.613	13.05	3.26	42.07	19.94	31.32	7.83	100.97	47.87
7	30.00	22	2.96E+07	4.91E-02	3.20E+03	3.40	2.94	1.89	1.79	6.42	6.08	0.151	0.604	13.25	3.31	42.49	20.15	31.79	7.95	101.98	48.35

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-88	-
Chainage	9+346	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	127.33	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-88	1.20	22.00	19.50	12.00	229.74	101.43	14.77	3.69
BH-88	1.20	23.50	21.00	13.50	244.88	114.40	15.43	3.86
BH-88	1.20	25.00	22.50	15.00	260.01	127.37	15.98	4.00
BH-88	1.20	26.50	24.00	16.50	275.68	140.34	16.44	4.11
BH-88	1.20	28.00	25.50	18.00	290.81	153.31	16.83	4.21
BH-88	1.20	29.50	27.00	19.50	305.94	166.28	17.15	4.29
BH-88	1.20	30.00	27.50	20.00	310.99	170.60	17.41	4.35

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.01	23	-	6.00	8.68	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.69	0.01	23	-	6.00	8.68	1.00	-	4.75	5.50	15.06	20.08	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.84	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	25.96	31.85	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.84	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	37.73	43.61	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	7.84	0.00	26	-	11.90	13.19	1.00	-	9.25	10.00	49.49	55.38	5.65	0.00	0.00	0.00	0.00	15.83
6	10.00	11.50	1.50	Granular	9.59	0.00	26	-	11.90	13.19	1.00	-	10.75	11.50	62.57	69.77	5.65	16.11	112.24	128.35	51.34	22.72
7	11.50	13.00	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	76.96	84.16	5.65	19.82	133.78	169.72	67.89	30.65
8	13.00	14.50	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	91.35	98.55	5.65	23.53	155.33	214.79	85.92	39.61
9	14.50	16.00	1.50	Granular	9.59	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	105.74	112.94	5.65	30.37	269.51	359.35	143.74	50.49
10	16.00	17.50	1.50	Granular	9.59	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	120.13	127.33	5.65	34.51	302.39	426.73	170.69	62.52
11	17.50	19.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	127.33	127.33	5.65	37.84	336.51	498.69	199.47	75.49
12	19.00	20.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	127.33	127.33	5.65	37.84	336.51	536.52	214.61	88.46
13	20.50	22.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	127.33	127.33	5.65	37.84	336.51	574.36	229.74	101.43
14	22.00	23.50	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	127.33	127.33	5.65	37.84	336.51	612.19	244.88	114.40
15	23.50	25.00	1.50	Granular	9.19	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	127.33	127.33	5.65	37.84	336.51	650.03	260.01	127.37
16	25.00	26.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	127.33	127.33	5.65	37.84	337.84	689.19	275.68	140.34
17	26.50	28.00	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	127.33	127.33	5.65	37.84	337.84	727.03	290.81	153.31
18	28.00	29.50	1.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	127.33	127.33	5.65	37.84	337.84	764.86	305.94	166.28
19	29.50	30.00	0.50	Granular	10.19	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	127.33	127.33	1.88	12.61	337.84	777.47	310.99	170.60

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.46E+03	4.14	2.41	1.90	1.80	7.89	7.45	0.135	0.542	14.77	3.69	58.26	27.49	35.44	8.86	139.83	65.97
2	22.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	2.45	1.90	1.80	7.78	7.34	0.130	0.518	15.43	3.86	60.00	28.32	37.04	9.26	144.01	67.97
3	24.00	20	2.96E+07	1.02E-01	2.79E+03	4.04	2.47	1.90	1.80	7.69	7.26	0.125	0.501	15.98	4.00	61.41	29.00	38.35	9.59	147.39	69.59
4	25.50	21	2.96E+07	1.02E-01	2.92E+03	4.01	2.50	1.90	1.80	7.61	7.19	0.122	0.487	16.44	4.11	62.59	29.56	39.47	9.87	150.22	70.95
5	27.00	21	2.96E+07	1.02E-01	3.03E+03	3.98	2.51	1.90	1.79	7.55	7.14	0.119	0.475	16.83	4.21	63.56	30.02	40.38	10.10	152.54	72.06
6	28.50	22	2.96E+07	1.02E-01	3.12E+03	3.95	2.53	1.90	1.79	7.51	7.09	0.117	0.466	17.15	4.29	64.38	30.41	41.16	10.29	154.50	73.00
7	30.00	22	2.96E+07	1.02E-01	3.20E+03	3.93	2.54	1.90	1.79	7.47	7.06	0.115	0.459	17.41	4.35	65.03	30.73	41.79	10.45	156.07	73.75

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-89	-
Chainage	9+428	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	106.42	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-89	1.00	22.00	19.50	12.00	126.01	74.52	11.89	2.97
BH-89	1.00	23.50	21.00	13.50	135.50	82.81	12.34	3.08
BH-89	1.00	25.00	22.50	15.00	153.53	91.35	12.70	3.18
BH-89	1.00	26.50	24.00	16.50	163.37	99.88	13.01	3.25
BH-89	1.00	28.00	25.50	18.00	190.03	108.91	13.27	3.32
BH-89	1.00	29.50	27.00	19.50	200.57	117.94	13.48	3.37
BH-89	1.00	30.00	27.50	20.00	204.09	120.95	13.66	3.41

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.84	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	15.92	21.81	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	27.69	33.57	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	9.59	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	40.77	47.96	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	55.16	62.35	4.71	0.00	0.00	0.00	0.00	11.00
6	10.00	11.50	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	69.55	76.74	4.71	14.93	84.30	99.22	39.69	16.82
7	11.50	13.00	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	83.94	91.13	4.71	18.01	99.26	132.20	52.88	23.52
8	13.00	14.50	1.50	Granular	10.19	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	98.78	106.42	4.71	21.20	115.44	169.58	67.83	31.10
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	106.42	106.42	4.71	24.60	155.75	234.49	93.79	39.64
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	106.42	106.42	4.71	24.60	155.75	259.08	103.63	48.17
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	106.42	106.42	4.71	26.35	196.07	325.75	130.30	57.20
12	19.00	20.50	1.50	Granular	9.59	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	106.42	106.42	4.71	26.35	195.61	351.64	140.66	66.23
13	20.50	22.00	1.50	Granular	9.59	0.10	27	-	13.80	15.50	1.00	-	21.25	22.00	106.42	106.42	4.71	23.72	135.27	315.02	126.01	74.52
14	22.00	23.50	1.50	Granular	9.59	0.10	27	-	13.80	15.50	1.00	-	22.75	23.50	106.42	106.42	4.71	23.72	135.27	338.74	135.50	82.81
15	23.50	25.00	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	106.42	106.42	4.71	24.60	155.75	383.82	153.53	91.35
16	25.00	26.50	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	25.75	26.50	106.42	106.42	4.71	24.60	155.75	408.41	163.37	99.88
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	106.42	106.42	4.71	26.35	196.07	475.08	190.03	108.91
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	106.42	106.42	4.71	26.35	196.07	501.43	200.57	117.94
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	106.42	106.42	1.57	8.78	196.07	510.22	204.09	120.95

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	4.91E-02	2.69E+03	3.52	2.84	1.89	1.79	6.65	6.30	0.168	0.673	11.89	2.97	39.54	18.73	28.53	7.13	94.89	44.96
2	22.50	20	2.96E+07	4.91E-02	2.85E+03	3.48	2.87	1.89	1.79	6.57	6.23	0.162	0.649	12.34	3.08	40.52	19.20	29.61	7.40	97.26	46.09
3	24.00	21	2.96E+07	4.91E-02	2.99E+03	3.45	2.90	1.89	1.79	6.51	6.17	0.157	0.630	12.70	3.18	41.32	19.59	30.48	7.62	99.17	47.00
4	25.50	22	2.96E+07	4.91E-02	3.11E+03	3.42	2.92	1.89	1.79	6.45	6.12	0.154	0.615	13.01	3.25	41.99	19.91	31.23	7.81	100.78	47.77
5	27.00	23	2.96E+07	4.91E-02	3.21E+03	3.40	2.94	1.89	1.79	6.41	6.08	0.151	0.603	13.27	3.32	42.54	20.17	31.84	7.96	102.09	48.40
6	28.50	23	2.96E+07	4.91E-02	3.29E+03	3.38	2.96	1.89	1.79	6.38	6.05	0.148	0.593	13.48	3.37	43.00	20.39	32.36	8.09	103.20	48.93
7	30.00	24	2.96E+07	4.91E-02	3.36E+03	3.37	2.97	1.89	1.79	6.35	6.02	0.146	0.586	13.66	3.41	43.37	20.56	32.77	8.19	104.08	49.35

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-89	-
Chainage	9+428	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	137.00	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	10.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-89	1.20	22.00	19.50	12.00	200.26	104.98	15.61	3.90
BH-89	1.20	23.50	21.00	13.50	214.91	117.62	16.20	4.05
BH-89	1.20	25.00	22.50	15.00	245.24	130.63	16.69	4.17
BH-89	1.20	26.50	24.00	16.50	260.44	143.65	17.10	4.28
BH-89	1.20	28.00	25.50	18.00	306.54	157.42	17.44	4.36
BH-89	1.20	29.50	27.00	19.50	322.83	171.19	17.73	4.43
BH-89	1.20	30.00	27.50	20.00	328.26	175.78	17.96	4.49

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.84	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	15.92	21.81	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.84	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	27.69	33.57	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	9.59	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	40.77	47.96	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	9.25	10.00	55.16	62.35	5.65	0.00	0.00	0.00	0.00	15.83
6	10.00	11.50	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	10.75	11.50	69.55	76.74	5.65	17.91	122.68	140.59	56.24	23.22
7	11.50	13.00	1.50	Granular	9.59	0.05	26	-	11.90	13.19	1.00	-	12.25	13.00	83.94	91.13	5.65	21.62	144.23	183.75	73.50	31.65
8	13.00	14.50	1.50	Granular	10.19	0.05	26	-	11.90	13.19	1.00	-	13.75	14.50	98.78	106.42	5.65	25.44	167.61	232.57	93.03	41.15
9	14.50	16.00	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	114.07	121.71	5.65	31.64	257.02	353.62	141.45	52.38
10	16.00	17.50	1.50	Granular	10.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	129.36	137.00	5.65	35.88	287.94	420.42	168.17	64.80
11	17.50	19.00	1.50	Granular	10.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	137.00	137.00	5.65	40.71	362.48	535.67	214.27	78.58
12	19.00	20.50	1.50	Granular	9.59	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	137.00	137.00	5.65	40.71	361.69	575.58	230.23	92.35
13	20.50	22.00	1.50	Granular	9.59	0.10	27	-	13.80	15.50	1.00	-	21.25	22.00	137.00	137.00	5.65	36.64	250.11	500.64	200.26	104.98
14	22.00	23.50	1.50	Granular	9.59	0.10	27	-	13.80	15.50	1.00	-	22.75	23.50	137.00	137.00	5.65	36.64	250.11	537.28	214.91	117.62
15	23.50	25.00	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	24.25	25.00	137.00	137.00	5.65	38.00	287.94	613.11	245.24	130.63
16	25.00	26.50	1.50	Granular	10.19	0.11	28	-	15.70	17.82	1.00	-	25.75	26.50	137.00	137.00	5.65	38.00	287.94	651.11	260.44	143.65
17	26.50	28.00	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	137.00	137.00	5.65	40.71	362.48	766.36	306.54	157.42
18	28.00	29.50	1.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	137.00	137.00	5.65	40.71	362.48	807.07	322.83	171.19
19	29.50	30.00	0.50	Granular	10.19	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	137.00	137.00	1.88	13.57	362.48	820.64	328.26	175.78

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	19	2.96E+07	1.02E-01	2.69E+03	4.07	2.46	1.90	1.80	7.75	7.31	0.128	0.513	15.61	3.90	60.45	28.54	37.46	9.36	145.08	68.49
2	22.50	20	2.96E+07	1.02E-01	2.85E+03	4.02	2.48	1.90	1.80	7.65	7.23	0.123	0.494	16.20	4.05	61.98	29.27	38.88	9.72	148.74	70.24
3	24.00	21	2.96E+07	1.02E-01	2.99E+03	3.99	2.51	1.90	1.80	7.58	7.16	0.120	0.479	16.69	4.17	63.21	29.86	40.05	10.01	151.71	71.66
4	25.50	22	2.96E+07	1.02E-01	3.11E+03	3.96	2.53	1.90	1.79	7.51	7.10	0.117	0.468	17.10	4.28	64.25	30.36	41.05	10.26	154.21	72.85
5	27.00	23	2.96E+07	1.02E-01	3.21E+03	3.93	2.54	1.90	1.79	7.46	7.05	0.115	0.459	17.44	4.36	65.10	30.76	41.86	10.46	156.24	73.83
6	28.50	23	2.96E+07	1.02E-01	3.29E+03	3.91	2.56	1.90	1.79	7.42	7.02	0.113	0.451	17.73	4.43	65.81	31.10	42.55	10.64	157.96	74.65
7	30.00	24	2.96E+07	1.02E-01	3.36E+03	3.89	2.57	1.90	1.79	7.39	6.99	0.111	0.445	17.96	4.49	66.38	31.37	43.10	10.78	159.31	75.30

A.11. Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-91	1.00	22.00	19.50	18.00	306.43	139.44	9.83	2.46	144.77	77.28	9.83	2.46
BH-91	1.00	23.50	21.00	19.50	325.86	154.69	9.95	2.49	154.00	85.39	9.95	2.49
BH-91	1.00	25.00	22.50	21.00	345.30	169.95	10.30	2.58	163.24	93.50	10.30	2.58
BH-91	1.00	26.50	24.00	22.50	364.73	185.20	10.60	2.65	172.47	101.61	10.60	2.65
BH-91	1.00	28.00	25.50	24.00	384.16	200.45	10.85	2.71	181.71	109.73	10.85	2.71
BH-91	1.00	29.50	27.00	25.50	403.59	215.70	11.07	2.77	190.94	117.84	11.07	2.77
BH-91	1.00	30.00	27.50	26.00	410.07	220.79	11.24	2.81	194.02	120.54	11.24	2.81
BH-91	1.20	22.00	19.50	18.00	439.91	181.40	12.80	3.20	228.43	106.80	12.80	3.20
BH-91	1.20	23.50	21.00	19.50	466.20	202.18	12.95	3.24	242.49	119.01	12.95	3.24
BH-91	1.20	25.00	22.50	21.00	492.49	222.96	13.41	3.35	256.54	131.23	13.41	3.35
BH-91	1.20	26.50	24.00	22.50	518.79	243.74	13.80	3.45	270.60	143.44	13.80	3.45
BH-91	1.20	28.00	25.50	24.00	545.08	264.52	14.12	3.53	284.65	155.65	14.12	3.53
BH-91	1.20	29.50	27.00	25.50	571.38	285.30	14.40	3.60	298.71	167.87	14.40	3.60
BH-91	1.20	30.00	27.50	26.00	580.14	292.23	14.62	3.66	303.39	171.94	14.62	3.66
BH-92	1.00	22.00	19.50	16.50	251.81	128.89	10.38	2.59	124.13	74.23	10.38	2.59
BH-92	1.00	23.50	21.00	18.00	268.29	142.08	10.60	2.65	132.45	81.70	10.60	2.65
BH-92	1.00	25.00	22.50	19.50	298.60	155.67	10.82	2.71	147.88	89.38	10.82	2.71
BH-92	1.00	26.50	24.00	21.00	315.67	169.27	11.08	2.77	156.50	97.06	11.08	2.77
BH-92	1.00	28.00	25.50	22.50	332.74	182.87	11.37	2.84	165.12	104.74	11.37	2.84

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-92	1.00	29.50	27.00	24.00	349.81	196.47	11.61	2.90	173.74	112.42	11.61	2.90
BH-92	1.00	30.00	27.50	24.50	355.50	201.00	11.80	2.95	176.61	114.98	11.80	2.95
BH-92	1.20	22.00	19.50	16.50	359.03	168.38	13.48	3.37	193.92	102.78	13.48	3.37
BH-92	1.20	23.50	21.00	18.00	381.61	186.56	13.77	3.44	206.71	114.11	13.77	3.44
BH-92	1.20	25.00	22.50	19.50	426.79	205.31	14.06	3.52	232.49	125.75	14.06	3.52
BH-92	1.20	26.50	24.00	21.00	450.18	224.05	14.40	3.60	245.73	137.40	14.40	3.60
BH-92	1.20	28.00	25.50	22.50	473.56	242.79	14.77	3.69	258.97	149.04	14.77	3.69
BH-92	1.20	29.50	27.00	24.00	496.94	261.54	15.08	3.77	272.22	160.68	15.08	3.77
BH-92	1.20	30.00	27.50	24.50	504.74	267.78	15.33	3.83	276.63	164.57	15.33	3.83
BH-93	1.00	22.00	19.50	16.50	302.38	138.05	10.35	2.59	140.45	75.70	10.35	2.59
BH-93	1.00	23.50	21.00	18.00	321.52	153.10	10.79	2.70	149.40	83.61	10.79	2.70
BH-93	1.00	25.00	22.50	19.50	340.67	168.15	11.16	2.79	158.34	91.52	11.16	2.79
BH-93	1.00	26.50	24.00	21.00	359.81	183.20	11.47	2.87	167.28	99.43	11.47	2.87
BH-93	1.00	28.00	25.50	22.50	378.95	198.25	11.72	2.93	176.23	107.34	11.72	2.93
BH-93	1.00	29.50	27.00	24.00	398.09	213.30	11.94	2.99	185.17	115.25	11.94	2.99
BH-93	1.00	30.00	27.50	24.50	404.48	218.32	12.12	3.03	188.15	117.89	12.12	3.03
BH-93	1.20	22.00	19.50	16.50	434.65	179.80	13.44	3.36	222.85	104.98	13.44	3.36
BH-93	1.20	23.50	21.00	18.00	460.59	200.34	14.02	3.50	236.56	116.95	14.02	3.50
BH-93	1.20	25.00	22.50	19.50	486.54	220.88	14.49	3.62	250.27	128.92	14.49	3.62
BH-93	1.20	26.50	24.00	21.00	512.49	241.41	14.90	3.72	263.97	140.89	14.90	3.72
BH-93	1.20	28.00	25.50	22.50	538.43	261.95	15.23	3.81	277.68	152.86	15.23	3.81
BH-93	1.20	29.50	27.00	24.00	564.38	282.49	15.51	3.88	291.39	164.83	15.51	3.88
BH-93	1.20	30.00	27.50	24.50	573.03	289.34	15.74	3.94	295.96	168.82	15.74	3.94
BH-95	1.00	22.00	19.50	16.50	271.55	136.49	10.43	2.61	126.29	75.29	10.43	2.61
BH-95	1.00	23.50	21.00	18.00	289.50	150.70	10.56	2.64	134.72	82.84	10.56	2.64

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-95	1.00	25.00	22.50	19.50	337.53	165.81	10.95	2.74	157.53	90.81	10.95	2.74
BH-95	1.00	26.50	24.00	21.00	357.12	180.91	11.27	2.82	166.93	98.77	11.27	2.82
BH-95	1.00	28.00	25.50	22.50	376.35	196.02	11.54	2.89	175.95	106.74	11.54	2.89
BH-95	1.00	29.50	27.00	24.00	395.57	211.13	11.77	2.94	184.98	114.71	11.77	2.94
BH-95	1.00	30.00	27.50	24.50	401.98	216.16	11.96	2.99	187.99	117.36	11.96	2.99
BH-95	1.20	22.00	19.50	16.50	384.99	177.72	13.54	3.39	196.79	104.28	13.54	3.39
BH-95	1.20	23.50	21.00	18.00	409.30	197.11	13.72	3.43	209.68	115.68	13.72	3.43
BH-95	1.20	25.00	22.50	19.50	482.23	217.71	14.22	3.56	248.75	127.71	14.22	3.56
BH-95	1.20	26.50	24.00	21.00	508.91	238.32	14.64	3.66	263.19	139.75	14.64	3.66
BH-95	1.20	28.00	25.50	22.50	534.95	258.93	14.99	3.75	277.00	151.79	14.99	3.75
BH-95	1.20	29.50	27.00	24.00	561.00	279.53	15.29	3.82	290.80	163.83	15.29	3.82
BH-95	1.20	30.00	27.50	24.50	569.68	286.40	15.53	3.88	295.41	167.85	15.53	3.88
BH-96	1.00	22.00	19.50	16.50	291.46	134.54	10.33	2.58	149.95	79.19	10.33	2.58
BH-96	1.00	23.50	21.00	18.00	309.78	149.01	10.66	2.66	159.53	87.54	10.66	2.66
BH-96	1.00	25.00	22.50	19.50	328.10	163.48	11.06	2.76	169.10	95.90	11.06	2.76
BH-96	1.00	26.50	24.00	21.00	346.42	177.96	11.40	2.85	178.68	104.25	11.40	2.85
BH-96	1.00	28.00	25.50	22.50	364.73	192.43	11.69	2.92	188.25	112.60	11.69	2.92
BH-96	1.00	29.50	27.00	24.00	383.05	206.90	11.93	2.98	197.83	120.95	11.93	2.98
BH-96	1.00	30.00	27.50	24.50	389.16	211.72	12.14	3.03	201.02	123.74	12.14	3.03
BH-96	1.20	22.00	19.50	16.50	426.07	176.85	13.42	3.35	241.27	110.43	13.42	3.35
BH-96	1.20	23.50	21.00	18.00	451.51	197.03	13.84	3.46	256.21	123.27	13.84	3.46
BH-96	1.20	25.00	22.50	19.50	476.94	217.21	14.37	3.59	271.16	136.11	14.37	3.59
BH-96	1.20	26.50	24.00	21.00	502.38	237.40	14.81	3.70	286.11	148.95	14.81	3.70
BH-96	1.20	28.00	25.50	22.50	527.82	257.58	15.18	3.80	301.05	161.79	15.18	3.80
BH-96	1.20	29.50	27.00	24.00	553.26	277.76	15.50	3.88	316.00	174.62	15.50	3.88

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-96	1.20	30.00	27.50	24.50	561.74	284.49	15.77	3.94	320.98	178.90	15.77	3.94
BH-97	1.00	22.00	19.50	18.00	317.24	144.74	11.53	2.88	153.59	81.19	11.53	2.88
BH-97	1.00	23.50	21.00	19.50	336.76	160.31	11.69	2.92	162.91	89.62	11.69	2.92
BH-97	1.00	25.00	22.50	21.00	356.65	175.88	11.94	2.98	172.60	98.05	11.94	2.98
BH-97	1.00	26.50	24.00	22.50	376.90	191.45	12.14	3.04	182.65	106.48	12.14	3.04
BH-97	1.00	28.00	25.50	24.00	396.79	207.02	12.31	3.08	192.34	114.91	12.31	3.08
BH-97	1.00	29.50	27.00	25.50	416.67	222.59	12.46	3.11	202.03	123.34	12.46	3.11
BH-97	1.00	30.00	27.50	26.00	423.30	227.78	12.57	3.14	205.26	126.15	12.57	3.14
BH-97	1.20	22.00	19.50	18.00	459.81	189.18	15.01	3.75	245.94	112.91	15.01	3.75
BH-97	1.20	23.50	21.00	19.50	486.49	210.68	15.21	3.80	260.39	125.84	15.21	3.80
BH-97	1.20	25.00	22.50	21.00	513.81	232.17	15.53	3.88	275.47	138.77	15.53	3.88
BH-97	1.20	26.50	24.00	22.50	541.77	253.67	15.80	3.95	291.19	151.70	15.80	3.95
BH-97	1.20	28.00	25.50	24.00	569.09	275.17	16.02	4.00	306.27	164.63	16.02	4.00
BH-97	1.20	29.50	27.00	25.50	596.41	296.67	16.20	4.05	321.35	177.56	16.20	4.05
BH-97	1.20	30.00	27.50	26.00	605.51	303.84	16.35	4.09	326.37	181.87	16.35	4.09
BH-98	1.00	22.00	19.50	15.00	267.26	115.48	9.89	2.47	122.14	64.89	9.89	2.47
BH-98	1.00	23.50	21.00	16.50	286.00	130.25	10.47	2.62	130.68	72.52	10.47	2.62
BH-98	1.00	25.00	22.50	18.00	304.75	145.01	10.61	2.65	139.23	80.15	10.61	2.65
BH-98	1.00	26.50	24.00	19.50	323.49	159.78	11.04	2.76	147.77	87.78	11.04	2.76
BH-98	1.00	28.00	25.50	21.00	342.23	174.55	11.39	2.85	156.31	95.41	11.39	2.85
BH-98	1.00	29.50	27.00	22.50	360.97	189.32	11.70	2.93	164.85	103.03	11.70	2.93
BH-98	1.00	30.00	27.50	23.00	367.22	194.24	11.96	2.99	167.70	105.58	11.96	2.99
BH-98	1.20	22.00	19.50	15.00	391.72	152.64	12.86	3.21	200.09	91.93	12.86	3.21
BH-98	1.20	23.50	21.00	16.50	417.18	172.84	13.61	3.40	213.31	103.57	13.61	3.40
BH-98	1.20	25.00	22.50	18.00	442.65	193.04	13.80	3.45	226.54	115.20	13.80	3.45

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-98	1.20	26.50	24.00	19.50	468.12	213.24	14.36	3.59	239.77	126.83	14.36	3.59
BH-98	1.20	28.00	25.50	21.00	493.58	233.44	14.82	3.71	252.99	138.47	14.82	3.71
BH-98	1.20	29.50	27.00	22.50	519.05	253.64	15.22	3.81	266.22	150.10	15.22	3.81
BH-98	1.20	30.00	27.50	23.00	527.53	260.38	15.56	3.89	270.63	153.98	15.56	3.89
BH-99	1.00	22.00	19.50	19.50	319.19	145.70	10.60	2.65	155.25	81.94	10.60	2.65
BH-99	1.00	23.50	21.00	21.00	339.16	161.33	10.86	2.71	165.02	90.42	10.86	2.71
BH-99	1.00	25.00	22.50	22.50	359.13	176.95	11.07	2.77	174.79	98.91	11.07	2.77
BH-99	1.00	26.50	24.00	24.00	379.10	192.58	11.25	2.81	184.56	107.40	11.25	2.81
BH-99	1.00	28.00	25.50	25.50	399.06	208.21	11.40	2.85	194.32	115.89	11.40	2.85
BH-99	1.00	29.50	27.00	27.00	419.03	223.83	11.53	2.88	204.09	124.37	11.53	2.88
BH-99	1.00	30.00	27.50	27.50	425.69	229.04	11.63	2.91	207.35	127.20	11.63	2.91
BH-99	1.20	22.00	19.50	19.50	461.94	190.08	13.87	3.47	247.73	113.57	13.87	3.47
BH-99	1.20	23.50	21.00	21.00	489.36	211.65	14.21	3.55	262.91	126.57	14.21	3.55
BH-99	1.20	25.00	22.50	22.50	516.78	233.22	14.49	3.62	278.08	139.57	14.49	3.62
BH-99	1.20	26.50	24.00	24.00	544.19	254.78	14.73	3.68	293.26	152.57	14.73	3.68
BH-99	1.20	28.00	25.50	25.50	571.61	276.35	14.92	3.73	308.44	165.57	14.92	3.73
BH-99	1.20	29.50	27.00	27.00	599.03	297.92	15.08	3.77	323.62	178.57	15.08	3.77
BH-99	1.20	30.00	27.50	27.50	608.17	305.11	15.21	3.80	328.68	182.90	15.21	3.80
BH-100	1.00	22.00	19.50	16.50	287.40	136.77	9.78	2.44	134.68	75.61	9.78	2.44
BH-100	1.00	23.50	21.00	18.00	306.09	151.50	9.95	2.49	143.51	83.44	9.95	2.49
BH-100	1.00	25.00	22.50	19.50	339.95	166.69	10.40	2.60	159.67	91.48	10.40	2.60
BH-100	1.00	26.50	24.00	21.00	359.29	181.87	10.78	2.69	168.80	99.53	10.78	2.69
BH-100	1.00	28.00	25.50	22.50	378.62	197.06	11.09	2.77	177.94	107.57	11.09	2.77
BH-100	1.00	29.50	27.00	24.00	397.96	212.24	11.37	2.84	187.08	115.62	11.37	2.84
BH-100	1.00	30.00	27.50	24.50	404.41	217.30	11.59	2.90	190.12	118.30	11.59	2.90

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-100	1.20	22.00	19.50	16.50	410.31	177.91	12.70	3.18	211.37	104.52	12.70	3.18
BH-100	1.20	23.50	21.00	18.00	435.62	198.00	12.92	3.23	224.84	116.32	12.92	3.23
BH-100	1.20	25.00	22.50	19.50	485.42	218.70	13.51	3.38	251.59	128.46	13.51	3.38
BH-100	1.20	26.50	24.00	21.00	511.60	239.40	14.00	3.50	265.53	140.59	14.00	3.50
BH-100	1.20	28.00	25.50	22.50	537.78	260.10	14.41	3.60	279.47	152.72	14.41	3.60
BH-100	1.20	29.50	27.00	24.00	563.96	280.80	14.77	3.69	293.41	164.86	14.77	3.69
BH-100	1.20	30.00	27.50	24.50	572.68	287.70	15.06	3.76	298.06	168.90	15.06	3.76

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-91	-
Chainage	9+626	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	196.19	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-91	1.00	22.00	19.50	18.00	306.43	139.44	9.83	2.46
BH-91	1.00	23.50	21.00	19.50	325.86	154.69	9.95	2.49
BH-91	1.00	25.00	22.50	21.00	345.30	169.95	10.30	2.58
BH-91	1.00	26.50	24.00	22.50	364.73	185.20	10.60	2.65
BH-91	1.00	28.00	25.50	24.00	384.16	200.45	10.85	2.71
BH-91	1.00	29.50	27.00	25.50	403.59	215.70	11.07	2.77
BH-91	1.00	30.00	27.50	26.00	410.07	220.79	11.24	2.81

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.15	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	12.86	25.73	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.15	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	38.59	51.45	4.71	6.69	27.66	34.35	13.74	7.92
3	5.50	7.00	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	64.31	77.18	4.71	13.27	72.94	92.90	37.16	13.29
4	7.00	8.50	1.50	Granular	17.75	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	90.49	103.80	4.71	18.67	96.01	134.65	53.86	20.16
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	117.11	130.43	4.71	25.13	143.94	207.71	83.08	28.85
6	10.00	11.50	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	143.74	157.05	4.71	30.85	171.63	266.24	106.50	39.14
7	11.50	13.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	12.25	13.00	170.36	183.68	4.71	36.56	199.31	330.49	132.20	51.02
8	13.00	14.50	1.50	Granular	8.34	0.06	26	-	11.90	13.19	1.00	-	13.75	14.50	189.93	196.19	4.71	40.76	207.92	379.85	151.94	64.09
9	14.50	16.00	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	196.19	196.19	4.71	46.96	317.05	535.95	214.38	78.89
10	16.00	17.50	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	196.19	196.19	4.71	46.96	317.05	582.91	233.17	93.68
11	17.50	19.00	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	196.19	196.19	4.71	48.58	353.43	667.87	267.15	108.94
12	19.00	20.50	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	196.19	196.19	4.71	48.58	353.43	716.46	286.58	124.19
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	196.19	196.19	4.71	48.58	354.47	766.08	306.43	139.44
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	196.19	196.19	4.71	48.58	354.47	814.66	325.86	154.69
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	196.19	196.19	4.71	48.58	354.47	863.24	345.30	169.95
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	196.19	196.19	4.71	48.58	354.47	911.82	364.73	185.20
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	196.19	196.19	4.71	48.58	354.47	960.40	384.16	200.45
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	196.19	196.19	4.71	48.58	354.47	1008.99	403.59	215.70
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	196.19	196.19	1.57	16.19	354.47	1025.18	410.07	220.79

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)		L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.60E+03	3.54	1.13	2.00	1.83	7.09	6.48	0.203	0.814	9.83	2.46	34.84	15.93	23.60	5.90	83.62	38.23
2	22.50	19	2.96E+07	4.91E-02	2.65E+03	3.53	1.13	2.00	1.83	7.06	6.46	0.201	0.804	9.95	2.49	35.11	16.05	23.87	5.97	84.25	38.52
3	24.00	20	2.96E+07	4.91E-02	2.80E+03	3.49	1.15	2.00	1.83	6.98	6.38	0.194	0.777	10.30	2.58	35.94	16.44	24.72	6.18	86.25	39.45
4	25.50	21	2.96E+07	4.91E-02	2.93E+03	3.46	1.16	2.00	1.83	6.91	6.32	0.189	0.754	10.60	2.65	36.64	16.77	25.45	6.36	87.93	40.24
5	27.00	21	2.96E+07	4.91E-02	3.04E+03	3.43	1.16	2.00	1.83	6.86	6.28	0.184	0.737	10.85	2.71	37.21	17.03	26.05	6.51	89.30	40.88
6	28.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.07	2.77	37.69	17.26	26.56	6.64	90.46	41.42
7	30.00	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.18	1.99	1.83	6.78	6.21	0.178	0.712	11.24	2.81	38.08	17.44	26.97	6.74	91.39	41.85

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-91	-
Chainage	9+626	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	221.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	13.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-91	1.20	22.00	19.50	18.00	439.91	181.40	12.80	3.20
BH-91	1.20	23.50	21.00	19.50	466.20	202.18	12.95	3.24
BH-91	1.20	25.00	22.50	21.00	492.49	222.96	13.41	3.35
BH-91	1.20	26.50	24.00	22.50	518.79	243.74	13.80	3.45
BH-91	1.20	28.00	25.50	24.00	545.08	264.52	14.12	3.53
BH-91	1.20	29.50	27.00	25.50	571.38	285.30	14.40	3.60
BH-91	1.20	30.00	27.50	26.00	580.14	292.23	14.62	3.66

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.15	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	12.86	25.73	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.15	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	38.59	51.45	5.65	8.03	40.22	48.25	19.30	10.96
3	5.50	7.00	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	64.31	77.18	5.65	15.93	106.99	130.94	52.37	17.79
4	7.00	8.50	1.50	Granular	17.75	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	90.49	103.80	5.65	22.41	140.27	186.63	74.65	26.44
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	117.11	130.43	5.65	30.16	209.68	286.20	114.48	37.26
6	10.00	11.50	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	143.74	157.05	5.65	37.02	249.54	363.08	145.23	50.00
7	11.50	13.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	12.25	13.00	170.36	183.68	5.65	43.87	289.41	446.82	178.73	64.66
8	13.00	14.50	1.50	Granular	8.34	0.06	26	-	11.90	13.19	1.00	-	13.75	14.50	189.93	196.19	5.65	48.91	300.53	506.85	202.74	80.73
9	14.50	16.00	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	202.45	208.71	5.65	58.15	486.81	751.29	300.52	99.39
10	16.00	17.50	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	214.96	221.22	5.65	61.75	515.40	841.63	336.65	119.05
11	17.50	19.00	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	221.22	221.22	5.65	65.74	574.54	966.50	386.60	139.83
12	19.00	20.50	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	221.22	221.22	5.65	65.74	574.54	1032.24	412.89	160.61
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	221.22	221.22	5.65	65.74	576.33	1099.76	439.91	181.40
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	221.22	221.22	5.65	65.74	576.33	1165.50	466.20	202.18
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	221.22	221.22	5.65	65.74	576.33	1231.24	492.49	222.96
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	221.22	221.22	5.65	65.74	576.33	1296.97	518.79	243.74
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	221.22	221.22	5.65	65.74	576.33	1362.71	545.08	264.52
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	221.22	221.22	5.65	65.74	576.33	1428.45	571.38	285.30
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	221.22	221.22	1.88	21.91	576.33	1450.36	580.14	292.23

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)		L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.60E+03	4.10	0.98	2.02	1.83	8.28	7.52	0.156	0.625	12.80	3.20	52.97	24.07	30.72	7.68	127.13	57.76
2	22.50	19	2.96E+07	1.02E-01	2.65E+03	4.08	0.98	2.02	1.83	8.24	7.49	0.154	0.618	12.95	3.24	53.37	24.25	31.07	7.77	128.09	58.21
3	24.00	20	2.96E+07	1.02E-01	2.80E+03	4.04	0.99	2.02	1.83	8.15	7.41	0.149	0.597	13.41	3.35	54.63	24.84	32.18	8.05	131.11	59.61
4	25.50	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.00	2.02	1.83	8.07	7.34	0.145	0.580	13.80	3.45	55.69	25.33	33.12	8.28	133.66	60.79
5	27.00	21	2.96E+07	1.02E-01	3.04E+03	3.97	1.01	2.02	1.83	8.01	7.29	0.142	0.566	14.12	3.53	56.56	25.73	33.90	8.47	135.73	61.75
6	28.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.40	3.60	57.29	26.07	34.56	8.64	137.50	62.57
7	30.00	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.02	2.01	1.83	7.92	7.21	0.137	0.547	14.62	3.66	57.88	26.34	35.09	8.77	138.90	63.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-92	-
Chainage	9+737	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	178.26	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	12.85	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-92	1.00	22.00	19.50	16.50	251.81	128.89	10.38	2.59
BH-92	1.00	23.50	21.00	18.00	268.29	142.08	10.60	2.65
BH-92	1.00	25.00	22.50	19.50	298.60	155.67	10.82	2.71
BH-92	1.00	26.50	24.00	21.00	315.67	169.27	11.08	2.77
BH-92	1.00	28.00	25.50	22.50	332.74	182.87	11.37	2.84
BH-92	1.00	29.50	27.00	24.00	349.81	196.47	11.61	2.90
BH-92	1.00	30.00	27.50	24.50	355.50	201.00	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.15	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.86	25.73	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.48	51.23	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.09	27	-	13.80	15.50	1.00	-	6.25	7.00	63.98	76.73	4.71	14.26	103.01	117.27	46.91	11.69
4	7.00	8.50	1.50	Granular	17.00	0.09	27	-	13.80	15.50	1.00	-	7.75	8.50	89.48	102.23	4.71	19.94	134.17	168.37	67.35	18.92
5	8.50	10.00	1.50	Granular	17.00	0.09	27	-	13.80	15.50	1.00	-	9.25	10.00	114.98	127.73	4.71	25.62	165.33	225.16	90.06	27.75
6	10.00	11.50	1.50	Granular	17.00	0.09	27	-	13.80	15.50	1.00	-	10.75	11.50	140.48	153.23	4.71	31.31	196.50	287.63	115.05	38.16
7	11.50	13.00	1.50	Granular	8.34	0.09	27	-	13.80	15.50	1.00	-	12.25	13.00	159.48	165.74	4.71	35.54	207.08	333.76	133.50	49.76
8	13.00	14.50	1.50	Granular	8.34	0.09	27	-	13.80	15.50	1.00	-	13.75	14.50	172.00	178.26	4.71	38.33	222.38	387.38	154.95	62.15
9	14.50	16.00	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	178.26	178.26	4.71	42.67	288.60	496.27	198.51	75.74
10	16.00	17.50	1.50	Granular	8.49	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	178.26	178.26	4.71	42.67	288.70	539.04	215.62	89.34
11	17.50	19.00	1.50	Granular	8.49	0.08	28	-	15.70	17.82	1.00	-	18.25	19.00	178.26	178.26	4.71	41.20	255.58	547.12	218.85	102.52
12	19.00	20.50	1.50	Granular	8.49	0.08	28	-	15.70	17.82	1.00	-	19.75	20.50	178.26	178.26	4.71	41.20	255.58	588.32	235.33	115.71
13	20.50	22.00	1.50	Granular	8.49	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	178.26	178.26	4.71	41.20	255.58	629.52	251.81	128.89
14	22.00	23.50	1.50	Granular	8.49	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	178.26	178.26	4.71	41.20	255.58	670.72	268.29	142.08
15	23.50	25.00	1.50	Granular	8.49	0.05	29	-	17.60	20.13	1.00	-	24.25	25.00	178.26	178.26	4.71	42.67	288.70	746.51	298.60	155.67
16	25.00	26.50	1.50	Granular	8.49	0.05	29	-	17.60	20.13	1.00	-	25.75	26.50	178.26	178.26	4.71	42.67	288.70	789.18	315.67	169.27
17	26.50	28.00	1.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	27.25	28.00	178.26	178.26	4.71	42.67	288.70	831.85	332.74	182.87
18	28.00	29.50	1.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	28.75	29.50	178.26	178.26	4.71	42.67	288.70	874.52	349.81	196.47
19	29.50	30.00	0.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	29.75	30.00	178.26	178.26	1.57	14.22	288.70	888.74	355.50	201.00

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.56E+03	3.55	1.55	1.96	1.82	6.96	6.45	0.193	0.771	10.38	2.59	36.12	16.74	24.91	6.23	86.68	40.18
2	22.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.56	1.96	1.82	6.91	6.41	0.189	0.755	10.60	2.65	36.62	16.98	25.43	6.36	87.89	40.75
3	24.00	19	2.96E+07	4.91E-02	2.73E+03	3.51	1.57	1.96	1.81	6.86	6.37	0.185	0.739	10.82	2.71	37.14	17.23	25.98	6.49	89.14	41.35
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.722	11.08	2.77	37.74	17.51	26.60	6.65	90.57	42.02
5	27.00	21	2.96E+07	4.91E-02	2.95E+03	3.46	1.59	1.95	1.81	6.75	6.27	0.176	0.704	11.37	2.84	38.37	17.81	27.28	6.82	92.10	42.75
6	28.50	21	2.96E+07	4.91E-02	3.05E+03	3.43	1.60	1.95	1.81	6.71	6.23	0.172	0.689	11.61	2.90	38.91	18.07	27.86	6.96	93.39	43.36
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.27	28.32	7.08	94.43	43.85

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-92	-
Chainage	9+737	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	203.51	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	12.85	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-92	1.20	22.00	19.50	16.50	359.03	168.38	13.48	3.37
BH-92	1.20	23.50	21.00	18.00	381.61	186.56	13.77	3.44
BH-92	1.20	25.00	22.50	19.50	426.79	205.31	14.06	3.52
BH-92	1.20	26.50	24.00	21.00	450.18	224.05	14.40	3.60
BH-92	1.20	28.00	25.50	22.50	473.56	242.79	14.77	3.69
BH-92	1.20	29.50	27.00	24.00	496.94	261.54	15.08	3.77
BH-92	1.20	30.00	27.50	24.50	504.74	267.78	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.15	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.86	25.73	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	38.48	51.23	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.09	27	-	13.80	15.50	1.00	-	6.25	7.00	63.98	76.73	5.65	17.11	151.00	168.10	67.24	15.87
4	7.00	8.50	1.50	Granular	17.00	0.09	27	-	13.80	15.50	1.00	-	7.75	8.50	89.48	102.23	5.65	23.93	195.87	236.91	94.76	24.95
5	8.50	10.00	1.50	Granular	17.00	0.09	27	-	13.80	15.50	1.00	-	9.25	10.00	114.98	127.73	5.65	30.75	240.74	312.53	125.01	35.93
6	10.00	11.50	1.50	Granular	17.00	0.09	27	-	13.80	15.50	1.00	-	10.75	11.50	140.48	153.23	5.65	37.57	285.62	394.97	157.99	48.83
7	11.50	13.00	1.50	Granular	8.34	0.09	27	-	13.80	15.50	1.00	-	12.25	13.00	159.48	165.74	5.65	42.65	299.51	451.51	180.61	63.15
8	13.00	14.50	1.50	Granular	8.34	0.09	27	-	13.80	15.50	1.00	-	13.75	14.50	172.00	178.26	5.65	46.00	321.53	519.54	207.81	78.40
9	14.50	16.00	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	184.51	190.77	5.65	53.00	445.84	696.84	278.74	95.62
10	16.00	17.50	1.50	Granular	8.49	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	197.14	203.51	5.65	56.63	475.12	782.76	313.10	113.85
11	17.50	19.00	1.50	Granular	8.49	0.08	28	-	15.70	17.82	1.00	-	18.25	19.00	203.51	203.51	5.65	56.44	420.62	784.70	313.88	132.03
12	19.00	20.50	1.50	Granular	8.49	0.08	28	-	15.70	17.82	1.00	-	19.75	20.50	203.51	203.51	5.65	56.44	420.62	841.14	336.46	150.20
13	20.50	22.00	1.50	Granular	8.49	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	203.51	203.51	5.65	56.44	420.62	897.58	359.03	168.38
14	22.00	23.50	1.50	Granular	8.49	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	203.51	203.51	5.65	56.44	420.62	954.02	381.61	186.56
15	23.50	25.00	1.50	Granular	8.49	0.05	29	-	17.60	20.13	1.00	-	24.25	25.00	203.51	203.51	5.65	58.46	475.12	1066.99	426.79	205.31
16	25.00	26.50	1.50	Granular	8.49	0.05	29	-	17.60	20.13	1.00	-	25.75	26.50	203.51	203.51	5.65	58.46	475.12	1125.44	450.18	224.05
17	26.50	28.00	1.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	27.25	28.00	203.51	203.51	5.65	58.46	475.12	1183.90	473.56	242.79
18	28.00	29.50	1.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	28.75	29.50	203.51	203.51	5.65	58.46	475.12	1242.36	496.94	261.54
19	29.50	30.00	0.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	29.75	30.00	203.51	203.51	1.88	19.49	475.12	1261.85	504.74	267.78

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.56E+03	4.11	1.34	1.98	1.82	8.13	7.49	0.148	0.593	13.48	3.37	54.83	25.25	32.36	8.09	131.60	60.61
2	22.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.35	1.98	1.82	8.08	7.44	0.145	0.581	13.77	3.44	55.60	25.61	33.04	8.26	133.43	61.47
3	24.00	19	2.96E+07	1.02E-01	2.73E+03	4.06	1.35	1.98	1.82	8.02	7.39	0.142	0.569	14.06	3.52	56.39	25.99	33.75	8.44	135.33	62.37
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.96	7.34	0.139	0.556	14.40	3.60	57.29	26.41	34.56	8.64	137.50	63.39
5	27.00	21	2.96E+07	1.02E-01	2.95E+03	4.00	1.38	1.97	1.82	7.89	7.28	0.135	0.542	14.77	3.69	58.26	26.87	35.44	8.86	139.82	64.48
6	28.50	21	2.96E+07	1.02E-01	3.05E+03	3.97	1.38	1.97	1.82	7.84	7.23	0.133	0.531	15.08	3.77	59.08	27.25	36.19	9.05	141.79	65.40
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.73	27.56	36.79	9.20	143.36	66.15

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-93	-
Chainage	9+820	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	193.27	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-93	1.00	22.00	19.50	16.50	302.38	138.05	10.35	2.59
BH-93	1.00	23.50	21.00	18.00	321.52	153.10	10.79	2.70
BH-93	1.00	25.00	22.50	19.50	340.67	168.15	11.16	2.79
BH-93	1.00	26.50	24.00	21.00	359.81	183.20	11.47	2.87
BH-93	1.00	28.00	25.50	22.50	378.95	198.25	11.72	2.93
BH-93	1.00	29.50	27.00	24.00	398.09	213.30	11.94	2.99
BH-93	1.00	30.00	27.50	24.50	404.48	218.32	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.60	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.45	24.90	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.15	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	37.76	50.63	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.15	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	63.49	76.35	4.71	13.63	87.43	101.06	40.42	11.51
4	7.00	8.50	1.50	Granular	17.15	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.21	102.08	4.71	19.15	114.18	146.95	58.78	18.52
5	8.50	10.00	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	114.94	127.80	4.71	23.72	116.36	172.85	69.14	26.81
6	10.00	11.50	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	140.66	153.53	4.71	29.03	138.42	223.94	89.57	36.59
7	11.50	13.00	1.50	Granular	18.15	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	167.14	180.75	4.71	38.63	265.06	389.20	155.68	49.05
8	13.00	14.50	1.50	Granular	8.34	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	187.01	193.27	4.71	43.22	276.57	443.93	177.57	62.81
9	14.50	16.00	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	15.25	16.00	193.27	193.27	4.71	47.86	348.26	563.48	225.39	77.86
10	16.00	17.50	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	16.75	17.50	193.27	193.27	4.71	47.86	348.26	611.34	244.53	92.91
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	193.27	193.27	4.71	47.86	349.29	660.23	264.09	107.95
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	193.27	193.27	4.71	47.86	349.29	708.09	283.24	123.00
13	20.50	22.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	193.27	193.27	4.71	47.86	349.29	755.95	302.38	138.05
14	22.00	23.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	193.27	193.27	4.71	47.86	349.29	803.81	321.52	153.10
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	193.27	193.27	4.71	47.86	349.29	851.66	340.67	168.15
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	193.27	193.27	4.71	47.86	349.29	899.52	359.81	183.20
17	26.50	28.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	193.27	193.27	4.71	47.86	349.29	947.38	378.95	198.25
18	28.00	29.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	193.27	193.27	4.71	47.86	349.29	995.24	398.09	213.30
19	29.50	30.00	0.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	193.27	193.27	1.57	15.95	349.29	1011.19	404.48	218.32

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.97	6.46	0.193	0.773	10.35	2.59	36.04	16.71	24.83	6.21	86.50	40.09
2	22.50	19	2.96E+07	4.91E-02	2.72E+03	3.51	1.57	1.96	1.81	6.87	6.37	0.185	0.741	10.79	2.70	37.07	17.19	25.90	6.47	88.96	41.26
3	24.00	20	2.96E+07	4.91E-02	2.86E+03	3.48	1.58	1.95	1.81	6.79	6.31	0.179	0.717	11.16	2.79	37.90	17.59	26.78	6.69	90.96	42.21
4	25.50	21	2.96E+07	4.91E-02	2.99E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.174	0.698	11.47	2.87	38.60	17.92	27.52	6.88	92.64	43.01
5	27.00	22	2.96E+07	4.91E-02	3.09E+03	3.42	1.61	1.95	1.81	6.68	6.21	0.171	0.682	11.72	2.93	39.17	18.19	28.14	7.03	94.02	43.66
6	28.50	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.670	11.94	2.99	39.66	18.42	28.66	7.17	95.18	44.21
7	30.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.660	12.12	3.03	40.04	18.60	29.08	7.27	96.11	44.65

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-93	-
Chainage	9+820	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	218.30	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-93	1.20	22.00	19.50	16.50	434.65	179.80	13.44	3.36
BH-93	1.20	23.50	21.00	18.00	460.59	200.34	14.02	3.50
BH-93	1.20	25.00	22.50	19.50	486.54	220.88	14.49	3.62
BH-93	1.20	26.50	24.00	21.00	512.49	241.41	14.90	3.72
BH-93	1.20	28.00	25.50	22.50	538.43	261.95	15.23	3.81
BH-93	1.20	29.50	27.00	24.00	564.38	282.49	15.51	3.88
BH-93	1.20	30.00	27.50	24.50	573.03	289.34	15.74	3.94

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.60	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	12.45	24.90	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.15	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	37.76	50.63	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.15	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	63.49	76.35	5.65	16.35	128.22	144.57	57.83	15.66
4	7.00	8.50	1.50	Granular	17.15	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.21	102.08	5.65	22.98	166.74	206.07	82.43	24.47
5	8.50	10.00	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	114.94	127.80	5.65	28.46	169.50	237.29	94.92	34.81
6	10.00	11.50	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	140.66	153.53	5.65	34.83	201.27	303.89	121.56	46.94
7	11.50	13.00	1.50	Granular	18.15	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	167.14	180.75	5.65	46.35	384.92	533.89	213.56	62.30
8	13.00	14.50	1.50	Granular	8.34	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	187.01	193.27	5.65	51.87	399.74	600.58	240.23	79.19
9	14.50	16.00	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	15.25	16.00	199.52	205.78	5.65	59.29	535.21	795.34	318.14	98.17
10	16.00	17.50	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	16.75	17.50	212.04	218.30	5.65	63.01	567.09	890.22	356.09	118.19
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	218.30	218.30	5.65	64.87	568.88	956.88	382.75	138.72
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	218.30	218.30	5.65	64.87	568.88	1021.75	408.70	159.26
13	20.50	22.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	218.30	218.30	5.65	64.87	568.88	1086.62	434.65	179.80
14	22.00	23.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	218.30	218.30	5.65	64.87	568.88	1151.48	460.59	200.34
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	218.30	218.30	5.65	64.87	568.88	1216.35	486.54	220.88
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	218.30	218.30	5.65	64.87	568.88	1281.22	512.49	241.41
17	26.50	28.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	218.30	218.30	5.65	64.87	568.88	1346.09	538.43	261.95
18	28.00	29.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	218.30	218.30	5.65	64.87	568.88	1410.95	564.38	282.49
19	29.50	30.00	0.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	218.30	218.30	1.88	21.62	568.88	1432.58	573.03	289.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.12	1.34	1.98	1.82	8.14	7.50	0.149	0.595	13.44	3.36	54.72	25.20	32.26	8.06	131.32	60.48
2	22.50	19	2.96E+07	1.02E-01	2.72E+03	4.06	1.35	1.98	1.82	8.03	7.40	0.143	0.571	14.02	3.50	56.28	25.93	33.64	8.41	135.06	62.24
3	24.00	20	2.96E+07	1.02E-01	2.86E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.552	14.49	3.62	57.54	26.53	34.79	8.70	138.10	63.67
4	25.50	21	2.96E+07	1.02E-01	2.99E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.537	14.90	3.72	58.60	27.03	35.75	8.94	140.65	64.87
5	27.00	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.39	1.97	1.82	7.81	7.21	0.131	0.525	15.23	3.81	59.47	27.44	36.55	9.14	142.74	65.85
6	28.50	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.516	15.51	3.88	60.21	27.78	37.23	9.31	144.50	66.68
7	30.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.508	15.74	3.94	60.80	28.06	37.78	9.44	145.91	67.34

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-95	-
Chainage	10+044	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	194.09	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-95	1.00	22.00	19.50	16.50	271.55	136.49	10.43	2.61
BH-95	1.00	23.50	21.00	18.00	289.50	150.70	10.56	2.64
BH-95	1.00	25.00	22.50	19.50	337.53	165.81	10.95	2.74
BH-95	1.00	26.50	24.00	21.00	357.12	180.91	11.27	2.82
BH-95	1.00	28.00	25.50	22.50	376.35	196.02	11.54	2.89
BH-95	1.00	29.50	27.00	24.00	395.57	211.13	11.77	2.94
BH-95	1.00	30.00	27.50	24.50	401.98	216.16	11.96	2.99

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.15	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.86	25.73	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.15	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	38.59	51.45	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	64.31	77.18	4.71	13.27	72.94	86.21	34.49	11.41
4	7.00	8.50	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	90.04	102.90	4.71	18.58	95.00	126.86	50.74	18.26
5	8.50	10.00	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	115.76	128.63	4.71	23.89	117.07	172.81	69.12	26.60
6	10.00	11.50	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	141.49	154.35	4.71	29.20	139.13	224.06	89.63	36.43
7	11.50	13.00	1.50	Granular	18.15	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	167.96	181.58	4.71	38.82	266.22	389.97	155.99	48.95
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	187.83	194.09	4.71	43.41	277.72	444.89	177.96	62.75
9	14.50	16.00	1.50	Granular	8.34	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	194.09	194.09	4.71	46.46	313.72	527.35	210.94	77.41
10	16.00	17.50	1.50	Granular	8.34	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	194.09	194.09	4.71	46.46	313.72	573.81	229.52	92.07
11	17.50	19.00	1.50	Granular	8.34	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	194.09	194.09	4.71	48.06	349.71	657.86	263.15	107.17
12	19.00	20.50	1.50	Granular	8.34	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	194.09	194.09	4.71	48.06	349.71	705.93	282.37	122.28
13	20.50	22.00	1.50	Granular	8.49	0.12	28	-	15.70	17.82	1.00	-	21.25	22.00	194.09	194.09	4.71	44.86	277.82	678.89	271.55	136.49
14	22.00	23.50	1.50	Granular	8.49	0.12	28	-	15.70	17.82	1.00	-	22.75	23.50	194.09	194.09	4.71	44.86	277.82	723.75	289.50	150.70
15	23.50	25.00	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	194.09	194.09	4.71	48.06	349.83	843.82	337.53	165.81
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	194.09	194.09	4.71	48.06	350.75	892.80	357.12	180.91
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	194.09	194.09	4.71	48.06	350.75	940.87	376.35	196.02
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	194.09	194.09	4.71	48.06	350.75	988.93	395.57	211.13
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	194.09	194.09	1.57	16.02	350.75	1004.95	401.98	216.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.58E+03	3.55	1.55	1.96	1.82	6.95	6.44	0.192	0.767	10.43	2.61	36.23	16.79	25.02	6.26	86.94	40.31
2	22.50	19	2.96E+07	4.91E-02	2.63E+03	3.53	1.56	1.96	1.82	6.92	6.42	0.189	0.757	10.56	2.64	36.55	16.95	25.35	6.34	87.71	40.67
3	24.00	20	2.96E+07	4.91E-02	2.78E+03	3.50	1.57	1.96	1.81	6.84	6.34	0.183	0.731	10.95	2.74	37.42	17.36	26.27	6.57	89.82	41.67
4	25.50	20	2.96E+07	4.91E-02	2.91E+03	3.46	1.59	1.95	1.81	6.77	6.28	0.177	0.710	11.27	2.82	38.16	17.71	27.06	6.76	91.59	42.51
5	27.00	21	2.96E+07	4.91E-02	3.02E+03	3.44	1.60	1.95	1.81	6.72	6.24	0.173	0.693	11.54	2.89	38.77	18.00	27.70	6.93	93.04	43.19
6	28.50	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.67	6.20	0.170	0.680	11.77	2.94	39.28	18.24	28.25	7.06	94.27	43.78
7	30.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.96	2.99	39.69	18.43	28.69	7.17	95.25	44.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-95	-
Chainage	10+044	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	219.12	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-95	1.20	22.00	19.50	16.50	384.99	177.72	13.54	3.39
BH-95	1.20	23.50	21.00	18.00	409.30	197.11	13.72	3.43
BH-95	1.20	25.00	22.50	19.50	482.23	217.71	14.22	3.56
BH-95	1.20	26.50	24.00	21.00	508.91	238.32	14.64	3.66
BH-95	1.20	28.00	25.50	22.50	534.95	258.93	14.99	3.75
BH-95	1.20	29.50	27.00	24.00	561.00	279.53	15.29	3.82
BH-95	1.20	30.00	27.50	24.50	569.68	286.40	15.53	3.88

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.15	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.86	25.73	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.15	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	38.59	51.45	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	64.31	77.18	5.65	15.93	106.99	122.91	49.16	15.54
4	7.00	8.50	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	90.04	102.90	5.65	22.30	138.75	176.98	70.79	24.16
5	8.50	10.00	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	115.76	128.63	5.65	28.67	170.52	237.41	94.96	34.56
6	10.00	11.50	1.50	Granular	17.15	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	141.49	154.35	5.65	35.04	202.29	304.21	121.69	46.75
7	11.50	13.00	1.50	Granular	18.15	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	167.96	181.58	5.65	46.58	386.59	535.09	214.04	62.17
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	187.83	194.09	5.65	52.09	401.41	602.01	240.80	79.13
9	14.50	16.00	1.50	Granular	8.34	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	200.35	206.61	5.65	57.55	482.01	740.17	296.07	97.62
10	16.00	17.50	1.50	Granular	8.34	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	212.86	219.12	5.65	61.14	510.61	829.90	331.96	117.11
11	17.50	19.00	1.50	Granular	8.34	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	219.12	219.12	5.65	65.11	569.19	953.60	381.44	137.72
12	19.00	20.50	1.50	Granular	8.34	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	219.12	219.12	5.65	65.11	569.19	1018.71	407.48	158.32
13	20.50	22.00	1.50	Granular	8.49	0.12	28	-	15.70	17.82	1.00	-	21.25	22.00	219.12	219.12	5.65	60.77	452.18	962.48	384.99	177.72
14	22.00	23.50	1.50	Granular	8.49	0.12	28	-	15.70	17.82	1.00	-	22.75	23.50	219.12	219.12	5.65	60.77	452.18	1023.25	409.30	197.11
15	23.50	25.00	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	219.12	219.12	5.65	65.11	569.39	1205.56	482.23	217.71
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	219.12	219.12	5.65	65.11	570.98	1272.27	508.91	238.32
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	219.12	219.12	5.65	65.11	570.98	1337.38	534.95	258.93
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	219.12	219.12	5.65	65.11	570.98	1402.49	561.00	279.53
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	219.12	219.12	1.88	21.70	570.98	1424.20	569.68	286.40

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.58E+03	4.11	1.34	1.98	1.82	8.12	7.48	0.148	0.591	13.54	3.39	55.00	25.33	32.51	8.13	132.00	60.80
2	22.50	19	2.96E+07	1.02E-01	2.63E+03	4.09	1.34	1.98	1.82	8.09	7.45	0.146	0.583	13.72	3.43	55.48	25.56	32.94	8.23	133.16	61.34
3	24.00	20	2.96E+07	1.02E-01	2.78E+03	4.04	1.36	1.98	1.82	7.99	7.37	0.141	0.563	14.22	3.56	56.82	26.19	34.13	8.53	136.36	62.85
4	25.50	20	2.96E+07	1.02E-01	2.91E+03	4.01	1.37	1.97	1.82	7.91	7.30	0.137	0.546	14.64	3.66	57.94	26.72	35.15	8.79	139.05	64.12
5	27.00	21	2.96E+07	1.02E-01	3.02E+03	3.98	1.38	1.97	1.82	7.85	7.24	0.133	0.534	14.99	3.75	58.86	27.15	35.98	9.00	141.25	65.15
6	28.50	22	2.96E+07	1.02E-01	3.11E+03	3.95	1.39	1.97	1.82	7.80	7.20	0.131	0.523	15.29	3.82	59.63	27.51	36.70	9.17	143.12	66.03
7	30.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.53	3.88	60.25	27.80	37.27	9.32	144.61	66.73

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-96	-
Chainage	10+125	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	184.93	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	12.90	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-96	1.00	22.00	19.50	16.50	291.46	134.54	10.33	2.58
BH-96	1.00	23.50	21.00	18.00	309.78	149.01	10.66	2.66
BH-96	1.00	25.00	22.50	19.50	328.10	163.48	11.06	2.76
BH-96	1.00	26.50	24.00	21.00	346.42	177.96	11.40	2.85
BH-96	1.00	28.00	25.50	22.50	364.73	192.43	11.69	2.92
BH-96	1.00	29.50	27.00	24.00	383.05	206.90	11.93	2.98
BH-96	1.00	30.00	27.50	24.50	389.16	211.72	12.14	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	13.24	26.48	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	39.71	52.95	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	66.19	79.43	4.71	13.11	66.80	79.92	31.97	11.37
4	7.00	8.50	1.50	Granular	17.75	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	92.74	106.05	4.71	18.37	87.37	118.85	47.54	18.16
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	119.36	132.68	4.71	25.62	146.28	203.38	81.35	26.98
6	10.00	11.50	1.50	Granular	18.15	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	146.29	159.90	4.71	31.39	174.78	263.28	105.31	37.42
7	11.50	13.00	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	166.16	172.42	4.71	38.40	247.29	374.18	149.67	49.83
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	178.67	184.93	4.71	41.29	264.86	433.05	173.22	63.04
9	14.50	16.00	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	184.93	184.93	4.71	44.27	300.12	512.58	205.03	77.08
10	16.00	17.50	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	184.93	184.93	4.71	44.27	300.12	556.85	222.74	91.13
11	17.50	19.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	184.93	184.93	4.71	45.79	334.55	637.07	254.83	105.60
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	184.93	184.93	4.71	45.79	334.55	682.86	273.15	120.07
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	184.93	184.93	4.71	45.79	334.55	728.66	291.46	134.54
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	184.93	184.93	4.71	45.79	334.55	774.45	309.78	149.01
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	184.93	184.93	4.71	45.79	334.55	820.25	328.10	163.48
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	184.93	184.93	4.71	45.79	334.55	866.04	346.42	177.96
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	184.93	184.93	4.71	45.79	334.55	911.83	364.73	192.43
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	184.93	184.93	4.71	45.79	334.55	957.63	383.05	206.90
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	184.93	184.93	1.57	15.26	334.55	972.89	389.16	211.72

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.54E+03	3.56	1.55	1.96	1.82	6.97	6.46	0.194	0.774	10.33	2.58	36.00	16.69	24.79	6.20	86.41	40.05
2	22.50	19	2.96E+07	4.91E-02	2.67E+03	3.53	1.56	1.96	1.81	6.90	6.40	0.188	0.751	10.66	2.66	36.76	17.05	25.58	6.39	88.22	40.91
3	24.00	20	2.96E+07	4.91E-02	2.83E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.181	0.723	11.06	2.76	37.68	17.48	26.54	6.64	90.43	41.96
4	25.50	21	2.96E+07	4.91E-02	2.96E+03	3.45	1.59	1.95	1.81	6.74	6.26	0.175	0.702	11.40	2.85	38.45	17.85	27.37	6.84	92.29	42.84
5	27.00	22	2.96E+07	4.91E-02	3.08E+03	3.43	1.61	1.95	1.81	6.69	6.21	0.171	0.684	11.69	2.92	39.09	18.15	28.05	7.01	93.82	43.57
6	28.50	22	2.96E+07	4.91E-02	3.18E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.168	0.670	11.93	2.98	39.64	18.41	28.64	7.16	95.14	44.19
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.659	12.14	3.03	40.09	18.62	29.13	7.28	96.22	44.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-96	-
Chainage	10+125	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	214.01	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	12.90	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-96	1.20	22.00	19.50	16.50	426.07	176.85	13.42	3.35
BH-96	1.20	23.50	21.00	18.00	451.51	197.03	13.84	3.46
BH-96	1.20	25.00	22.50	19.50	476.94	217.21	14.37	3.59
BH-96	1.20	26.50	24.00	21.00	502.38	237.40	14.81	3.70
BH-96	1.20	28.00	25.50	22.50	527.82	257.58	15.18	3.80
BH-96	1.20	29.50	27.00	24.00	553.26	277.76	15.50	3.88
BH-96	1.20	30.00	27.50	24.50	561.74	284.49	15.77	3.94

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	13.24	26.48	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	39.71	52.95	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	66.19	79.43	5.65	15.73	97.80	113.54	45.41	15.49
4	7.00	8.50	1.50	Granular	17.75	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	92.74	106.05	5.65	22.05	127.42	165.20	66.08	24.04
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	119.36	132.68	5.65	30.74	213.05	281.57	112.63	35.02
6	10.00	11.50	1.50	Granular	18.15	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	146.29	159.90	5.65	37.67	254.14	360.33	144.13	47.94
7	11.50	13.00	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	166.16	172.42	5.65	46.08	357.58	509.85	203.94	63.22
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	178.67	184.93	5.65	49.55	382.89	584.72	233.89	79.47
9	14.50	16.00	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	192.20	199.47	5.65	55.21	467.33	724.37	289.75	97.30
10	16.00	17.50	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	206.74	214.01	5.65	59.39	500.55	816.98	326.79	116.31
11	17.50	19.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	214.01	214.01	5.65	63.59	557.97	937.98	375.19	136.49
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	214.01	214.01	5.65	63.59	557.97	1001.58	400.63	156.67
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	214.01	214.01	5.65	63.59	557.97	1065.17	426.07	176.85
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	214.01	214.01	5.65	63.59	557.97	1128.77	451.51	197.03
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	214.01	214.01	5.65	63.59	557.97	1192.36	476.94	217.21
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	214.01	214.01	5.65	63.59	557.97	1255.95	502.38	237.40
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	214.01	214.01	5.65	63.59	557.97	1319.55	527.82	257.58
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	214.01	214.01	5.65	63.59	557.97	1383.14	553.26	277.76
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	214.01	214.01	1.88	21.20	557.97	1404.34	561.74	284.49

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.54E+03	4.12	1.34	1.98	1.82	8.15	7.50	0.149	0.596	13.42	3.35	54.66	25.17	32.21	8.05	131.18	60.41
2	22.50	19	2.96E+07	1.02E-01	2.67E+03	4.08	1.35	1.98	1.82	8.06	7.43	0.144	0.578	13.84	3.46	55.81	25.71	33.22	8.31	133.94	61.71
3	24.00	20	2.96E+07	1.02E-01	2.83E+03	4.03	1.36	1.98	1.82	7.96	7.34	0.139	0.557	14.37	3.59	57.20	26.37	34.48	8.62	137.29	63.29
4	25.50	21	2.96E+07	1.02E-01	2.96E+03	3.99	1.38	1.97	1.82	7.88	7.27	0.135	0.540	14.81	3.70	58.38	26.92	35.55	8.89	140.11	64.61
5	27.00	22	2.96E+07	1.02E-01	3.08E+03	3.96	1.39	1.97	1.82	7.82	7.21	0.132	0.527	15.18	3.80	59.35	27.38	36.44	9.11	142.44	65.71
6	28.50	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.40	1.97	1.82	7.76	7.17	0.129	0.516	15.50	3.88	60.18	27.77	37.21	9.30	144.44	66.65
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.507	15.77	3.94	60.87	28.09	37.84	9.46	146.08	67.42

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-97	-
Chainage	10+222	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	200.77	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	13.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-97	1.00	22.00	19.50	18.00	317.24	144.74	11.53	2.88
BH-97	1.00	23.50	21.00	19.50	336.76	160.31	11.69	2.92
BH-97	1.00	25.00	22.50	21.00	356.65	175.88	11.94	2.98
BH-97	1.00	26.50	24.00	22.50	376.90	191.45	12.14	3.04
BH-97	1.00	28.00	25.50	24.00	396.79	207.02	12.31	3.08
BH-97	1.00	29.50	27.00	25.50	416.67	222.59	12.46	3.11
BH-97	1.00	30.00	27.50	26.00	423.30	227.78	12.57	3.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.15	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	12.86	25.73	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.15	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	38.59	51.45	4.71	6.69	27.66	34.35	13.74	7.92
3	5.50	7.00	1.50	Granular	18.30	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	65.18	78.90	4.71	13.45	74.88	95.01	38.01	13.34
4	7.00	8.50	1.50	Granular	18.30	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	92.63	106.35	4.71	19.11	98.42	137.67	55.07	20.34
5	8.50	10.00	1.50	Granular	18.30	0.08	26	-	11.90	13.19	1.00	-	9.25	10.00	120.08	133.80	4.71	25.77	147.71	212.73	85.09	29.20
6	10.00	11.50	1.50	Granular	18.15	0.08	26	-	11.90	13.19	1.00	-	10.75	11.50	147.41	161.03	4.71	31.64	175.95	272.61	109.04	39.71
7	11.50	13.00	1.50	Granular	18.15	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	174.64	188.25	4.71	40.36	275.59	412.61	165.04	52.66
8	13.00	14.50	1.50	Granular	8.34	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	194.51	200.77	4.71	44.95	287.10	469.07	187.63	66.90
9	14.50	16.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	15.25	16.00	200.77	200.77	4.71	49.72	362.56	594.25	237.70	82.47
10	16.00	17.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	16.75	17.50	200.77	200.77	4.71	49.72	362.56	643.96	257.59	98.04
11	17.50	19.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	200.77	200.77	4.71	49.72	362.56	693.68	277.47	113.61
12	19.00	20.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	200.77	200.77	4.71	49.72	362.56	743.39	297.36	129.17
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	200.77	200.77	4.71	49.72	362.56	793.11	317.24	144.74
14	22.00	23.50	1.50	Granular	8.49	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	200.77	200.77	4.71	49.72	361.64	841.90	336.76	160.31
15	23.50	25.00	1.50	Granular	8.49	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	200.77	200.77	4.71	49.72	361.64	891.62	356.65	175.88
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	200.77	200.77	4.71	49.72	362.56	942.25	376.90	191.45
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	200.77	200.77	4.71	49.72	362.56	991.97	396.79	207.02
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	200.77	200.77	4.71	49.72	362.56	1041.68	416.67	222.59
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	200.77	200.77	1.57	16.57	362.56	1058.26	423.30	227.78

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.34E+03	3.37	1.19	1.99	1.83	6.72	6.16	0.173	0.694	11.53	2.88	38.75	17.75	27.68	6.92	93.00	42.61
2	22.50	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.69	2.92	39.10	17.92	28.06	7.01	93.84	43.00
3	24.00	25	2.96E+07	4.91E-02	3.52E+03	3.33	1.20	1.99	1.83	6.64	6.09	0.168	0.670	11.94	2.98	39.64	18.17	28.65	7.16	95.15	43.61
4	25.50	25	2.96E+07	4.91E-02	3.62E+03	3.32	1.21	1.99	1.83	6.60	6.06	0.165	0.659	12.14	3.04	40.10	18.39	29.14	7.29	96.25	44.12
5	27.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.650	12.31	3.08	40.47	18.56	29.55	7.39	97.14	44.54
6	28.50	26	2.96E+07	4.91E-02	3.77E+03	3.29	1.22	1.99	1.83	6.55	6.01	0.161	0.642	12.46	3.11	40.79	18.71	29.90	7.47	97.90	44.90
7	30.00	27	2.96E+07	4.91E-02	3.82E+03	3.28	1.22	1.99	1.83	6.53	5.99	0.159	0.636	12.57	3.14	41.04	18.82	30.17	7.54	98.50	45.18

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-97	-
Chainage	10+222	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	229.85	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	13.50	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-97	1.20	22.00	19.50	18.00	459.81	189.18	15.01	3.75
BH-97	1.20	23.50	21.00	19.50	486.49	210.68	15.21	3.80
BH-97	1.20	25.00	22.50	21.00	513.81	232.17	15.53	3.88
BH-97	1.20	26.50	24.00	22.50	541.77	253.67	15.80	3.95
BH-97	1.20	28.00	25.50	24.00	569.09	275.17	16.02	4.00
BH-97	1.20	29.50	27.00	25.50	596.41	296.67	16.20	4.05
BH-97	1.20	30.00	27.50	26.00	605.51	303.84	16.35	4.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.15	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	12.86	25.73	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.15	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	38.59	51.45	5.65	8.03	40.22	48.25	19.30	10.96
3	5.50	7.00	1.50	Granular	18.30	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	65.18	78.90	5.65	16.14	109.90	134.06	53.63	17.85
4	7.00	8.50	1.50	Granular	18.30	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	92.63	106.35	5.65	22.94	143.80	190.90	76.36	26.65
5	8.50	10.00	1.50	Granular	18.30	0.08	26	-	11.90	13.19	1.00	-	9.25	10.00	120.08	133.80	5.65	30.92	215.18	293.20	117.28	37.68
6	10.00	11.50	1.50	Granular	18.15	0.08	26	-	11.90	13.19	1.00	-	10.75	11.50	147.41	161.03	5.65	37.96	255.82	371.81	148.72	50.69
7	11.50	13.00	1.50	Granular	18.15	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	174.64	188.25	5.65	48.43	400.08	564.51	225.80	66.62
8	13.00	14.50	1.50	Granular	8.34	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	194.51	200.77	5.65	53.95	414.91	633.28	253.31	84.10
9	14.50	16.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	15.25	16.00	208.04	215.31	5.65	61.82	561.26	841.45	336.58	103.79
10	16.00	17.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	16.75	17.50	222.58	229.85	5.65	66.14	598.30	944.62	377.85	124.68
11	17.50	19.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	229.85	229.85	5.65	68.30	598.30	1012.92	405.17	146.18
12	19.00	20.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	229.85	229.85	5.65	68.30	598.30	1081.22	432.49	167.68
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	229.85	229.85	5.65	68.30	598.30	1149.52	459.81	189.18
14	22.00	23.50	1.50	Granular	8.49	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	229.85	229.85	5.65	68.30	596.70	1216.23	486.49	210.68
15	23.50	25.00	1.50	Granular	8.49	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	229.85	229.85	5.65	68.30	596.70	1284.53	513.81	232.17
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	229.85	229.85	5.65	68.30	598.30	1354.42	541.77	253.67
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	229.85	229.85	5.65	68.30	598.30	1422.72	569.09	275.17
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	229.85	229.85	5.65	68.30	598.30	1491.02	596.41	296.67
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	229.85	229.85	1.88	22.77	598.30	1513.79	605.51	303.84

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.34E+03	3.90	1.03	2.01	1.83	7.85	7.15	0.133	0.533	15.01	3.75	58.89	26.81	36.02	9.00	141.35	64.35
2	22.50	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.81	7.12	0.131	0.526	15.21	3.80	59.42	27.06	36.51	9.13	142.62	64.94
3	24.00	25	2.96E+07	1.02E-01	3.52E+03	3.86	1.04	2.01	1.83	7.76	7.07	0.129	0.515	15.53	3.88	60.25	27.44	37.27	9.32	144.59	65.86
4	25.50	25	2.96E+07	1.02E-01	3.62E+03	3.84	1.04	2.01	1.83	7.72	7.03	0.127	0.506	15.80	3.95	60.94	27.76	37.91	9.48	146.26	66.63
5	27.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.02	4.00	61.51	28.03	38.44	9.61	147.61	67.26
6	28.50	26	2.96E+07	1.02E-01	3.77E+03	3.81	1.05	2.01	1.83	7.65	6.97	0.123	0.494	16.20	4.05	61.98	28.25	38.89	9.72	148.76	67.80
7	30.00	27	2.96E+07	1.02E-01	3.82E+03	3.80	1.05	2.01	1.83	7.63	6.95	0.122	0.489	16.35	4.09	62.36	28.42	39.25	9.81	149.67	68.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-98	-
Chainage	10+328	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	189.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-98	1.00	22.00	19.50	15.00	267.26	115.48	9.89	2.47
BH-98	1.00	23.50	21.00	16.50	286.00	130.25	10.47	2.62
BH-98	1.00	25.00	22.50	18.00	304.75	145.01	10.61	2.65
BH-98	1.00	26.50	24.00	19.50	323.49	159.78	11.04	2.76
BH-98	1.00	28.00	25.50	21.00	342.23	174.55	11.39	2.85
BH-98	1.00	29.50	27.00	22.50	360.97	189.32	11.70	2.93
BH-98	1.00	30.00	27.50	23.00	367.22	194.24	11.96	2.99

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.60	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.45	24.90	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.60	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	37.35	49.80	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	16.10	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	61.88	73.95	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	16.10	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	86.03	98.10	4.71	17.75	90.47	108.23	43.29	14.32
5	8.50	10.00	1.50	Granular	16.10	0.08	21	-	2.00	6.49	1.00	-	9.25	10.00	110.18	122.25	4.71	0.00	63.79	81.54	32.62	15.97
6	10.00	11.50	1.50	Granular	18.15	0.08	21	-	2.00	6.49	1.00	-	10.75	11.50	135.86	149.48	4.71	0.00	77.87	95.62	38.25	17.62
7	11.50	13.00	1.50	Granular	18.15	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	163.09	176.70	4.71	36.35	225.81	279.91	111.96	29.44
8	13.00	14.50	1.50	Granular	8.34	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	182.96	189.22	4.71	40.77	235.77	330.64	132.26	42.51
9	14.50	16.00	1.50	Granular	8.34	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	189.22	189.22	4.71	45.29	305.98	446.15	178.46	56.84
10	16.00	17.50	1.50	Granular	8.34	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	189.22	189.22	4.71	45.29	305.98	491.44	196.58	71.17
11	17.50	19.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	18.25	19.00	189.22	189.22	4.71	46.86	342.13	574.44	229.78	85.94
12	19.00	20.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	19.75	20.50	189.22	189.22	4.71	46.86	342.13	621.30	248.52	100.71
13	20.50	22.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	21.25	22.00	189.22	189.22	4.71	46.86	342.13	668.15	267.26	115.48
14	22.00	23.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	22.75	23.50	189.22	189.22	4.71	46.86	342.13	715.01	286.00	130.25
15	23.50	25.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	24.25	25.00	189.22	189.22	4.71	46.86	342.13	761.86	304.75	145.01
16	25.00	26.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	25.75	26.50	189.22	189.22	4.71	46.86	342.13	808.72	323.49	159.78
17	26.50	28.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	27.25	28.00	189.22	189.22	4.71	46.86	342.13	855.57	342.23	174.55
18	28.00	29.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	28.75	29.50	189.22	189.22	4.71	46.86	342.13	902.43	360.97	189.32
19	29.50	30.00	0.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	29.75	30.00	189.22	189.22	1.57	15.62	342.13	918.05	367.22	194.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.20E+03	3.66	1.91	1.93	1.81	7.07	6.62	0.202	0.809	9.89	2.47	34.97	16.36	23.73	5.93	83.93	39.26
2	22.50	17	2.96E+07	4.91E-02	2.40E+03	3.60	1.94	1.93	1.81	6.94	6.50	0.191	0.764	10.47	2.62	36.32	17.00	25.12	6.28	87.17	40.81
3	24.00	17	2.96E+07	4.91E-02	2.46E+03	3.58	1.95	1.93	1.81	6.91	6.47	0.189	0.754	10.61	2.65	36.65	17.16	25.46	6.37	87.96	41.18
4	25.50	18	2.96E+07	4.91E-02	2.61E+03	3.54	1.98	1.93	1.80	6.82	6.39	0.181	0.725	11.04	2.76	37.63	17.63	26.49	6.62	90.31	42.30
5	27.00	19	2.96E+07	4.91E-02	2.75E+03	3.50	2.00	1.92	1.80	6.75	6.32	0.176	0.702	11.39	2.85	38.43	18.01	27.35	6.84	92.24	43.23
6	28.50	20	2.96E+07	4.91E-02	2.86E+03	3.48	2.01	1.92	1.80	6.69	6.27	0.171	0.684	11.70	2.93	39.12	18.34	28.08	7.02	93.89	44.02
7	30.00	21	2.96E+07	4.91E-02	2.96E+03	3.45	2.03	1.92	1.80	6.64	6.23	0.167	0.669	11.96	2.99	39.69	18.61	28.70	7.17	95.26	44.67

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-98	-
Chainage	10+328	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	214.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-98	1.20	22.00	19.50	15.00	391.72	152.64	12.86	3.21
BH-98	1.20	23.50	21.00	16.50	417.18	172.84	13.61	3.40
BH-98	1.20	25.00	22.50	18.00	442.65	193.04	13.80	3.45
BH-98	1.20	26.50	24.00	19.50	468.12	213.24	14.36	3.59
BH-98	1.20	28.00	25.50	21.00	493.58	233.44	14.82	3.71
BH-98	1.20	29.50	27.00	22.50	519.05	253.64	15.22	3.81
BH-98	1.20	30.00	27.50	23.00	527.53	260.38	15.56	3.89

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.60	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.45	24.90	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.60	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	37.35	49.80	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	16.10	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	61.88	73.95	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	16.10	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	86.03	98.10	5.65	21.30	132.11	153.41	61.37	19.42
5	8.50	10.00	1.50	Granular	16.10	0.08	21	-	2.00	6.49	1.00	-	9.25	10.00	110.18	122.25	5.65	0.00	92.22	113.52	45.41	21.80
6	10.00	11.50	1.50	Granular	18.15	0.08	21	-	2.00	6.49	1.00	-	10.75	11.50	135.86	149.48	5.65	0.00	112.55	133.85	53.54	24.17
7	11.50	13.00	1.50	Granular	18.15	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	163.09	176.70	5.65	43.62	328.01	392.93	157.17	38.76
8	13.00	14.50	1.50	Granular	8.34	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	182.96	189.22	5.65	48.93	340.82	454.66	181.87	54.84
9	14.50	16.00	1.50	Granular	8.34	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	195.47	201.73	5.65	56.15	470.88	640.87	256.35	72.93
10	16.00	17.50	1.50	Granular	8.34	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	207.99	214.25	5.65	59.74	499.47	729.21	291.68	92.04
11	17.50	19.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	18.25	19.00	214.25	214.25	5.65	63.66	558.56	851.97	340.79	112.24
12	19.00	20.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	19.75	20.50	214.25	214.25	5.65	63.66	558.56	915.63	366.25	132.44
13	20.50	22.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	21.25	22.00	214.25	214.25	5.65	63.66	558.56	979.30	391.72	152.64
14	22.00	23.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	22.75	23.50	214.25	214.25	5.65	63.66	558.56	1042.96	417.18	172.84
15	23.50	25.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	24.25	25.00	214.25	214.25	5.65	63.66	558.56	1106.62	442.65	193.04
16	25.00	26.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	25.75	26.50	214.25	214.25	5.65	63.66	558.56	1170.29	468.12	213.24
17	26.50	28.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	27.25	28.00	214.25	214.25	5.65	63.66	558.56	1233.95	493.58	233.44
18	28.00	29.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	28.75	29.50	214.25	214.25	5.65	63.66	558.56	1297.62	519.05	253.64
19	29.50	30.00	0.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	29.75	30.00	214.25	214.25	1.88	21.22	558.56	1318.84	527.53	260.38

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.20E+03	4.24	1.65	1.95	1.81	8.26	7.68	0.156	0.622	12.86	3.21	53.12	24.70	30.86	7.71	127.49	59.27
2	22.50	17	2.96E+07	1.02E-01	2.40E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.588	13.61	3.40	55.18	25.67	32.67	8.17	132.43	61.61
3	24.00	17	2.96E+07	1.02E-01	2.46E+03	4.15	1.69	1.95	1.81	8.07	7.51	0.145	0.580	13.80	3.45	55.68	25.91	33.11	8.28	133.63	62.19
4	25.50	18	2.96E+07	1.02E-01	2.61E+03	4.10	1.71	1.94	1.81	7.97	7.42	0.139	0.557	14.36	3.59	57.17	26.62	34.45	8.61	137.22	63.89
5	27.00	19	2.96E+07	1.02E-01	2.75E+03	4.06	1.73	1.94	1.81	7.88	7.34	0.135	0.540	14.82	3.71	58.41	27.21	35.57	8.89	140.17	65.29
6	28.50	20	2.96E+07	1.02E-01	2.86E+03	4.02	1.74	1.94	1.81	7.81	7.28	0.131	0.526	15.22	3.81	59.46	27.70	36.54	9.13	142.69	66.49
7	30.00	21	2.96E+07	1.02E-01	2.96E+03	3.99	1.75	1.94	1.81	7.75	7.23	0.129	0.514	15.56	3.89	60.32	28.12	37.34	9.33	144.78	67.48

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-99	-
Chainage	10+428	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	201.59	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	13.40	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-99	1.00	22.00	19.50	19.50	319.19	145.70	10.60	2.65
BH-99	1.00	23.50	21.00	21.00	339.16	161.33	10.86	2.71
BH-99	1.00	25.00	22.50	22.50	359.13	176.95	11.07	2.77
BH-99	1.00	26.50	24.00	24.00	379.10	192.58	11.25	2.81
BH-99	1.00	28.00	25.50	25.50	399.06	208.21	11.40	2.85
BH-99	1.00	29.50	27.00	27.00	419.03	223.83	11.53	2.88
BH-99	1.00	30.00	27.50	27.50	425.69	229.04	11.63	2.91

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	13.24	26.48	4.71	2.62	25.98	28.60	11.44	5.13
2	4.00	5.50	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	39.71	52.95	4.71	7.87	46.39	56.88	22.75	8.98
3	5.50	7.00	1.50	Granular	18.15	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	66.56	80.18	4.71	13.19	67.54	91.22	36.49	14.33
4	7.00	8.50	1.50	Granular	18.15	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	93.79	107.40	4.71	18.58	88.53	130.79	52.32	21.18
5	8.50	10.00	1.50	Granular	18.15	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	121.01	134.63	4.71	26.97	174.39	243.62	97.45	30.38
6	10.00	11.50	1.50	Granular	18.15	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	148.24	161.85	4.71	33.04	207.66	309.92	123.97	41.28
7	11.50	13.00	1.50	Granular	18.15	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	175.46	189.08	4.71	42.00	312.56	456.83	182.73	54.69
8	13.00	14.50	1.50	Granular	8.34	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	195.33	201.59	4.71	46.76	325.62	516.64	206.66	69.43
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	201.59	201.59	4.71	48.26	326.55	565.83	226.33	84.59
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	201.59	201.59	4.71	48.26	326.55	614.09	245.63	99.75
11	17.50	19.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	201.59	201.59	4.71	48.26	326.55	662.34	264.94	114.91
12	19.00	20.50	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	201.59	201.59	4.71	48.26	326.55	710.60	284.24	130.07
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	201.59	201.59	4.71	49.92	364.02	797.98	319.19	145.70
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	201.59	201.59	4.71	49.92	364.02	847.90	339.16	161.33
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	201.59	201.59	4.71	49.92	364.02	897.82	359.13	176.95
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	201.59	201.59	4.71	49.92	364.02	947.74	379.10	192.58
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	201.59	201.59	4.71	49.92	364.02	997.66	399.06	208.21
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	201.59	201.59	4.71	49.92	364.02	1047.58	419.03	223.83
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	201.59	201.59	1.57	16.64	364.02	1064.22	425.69	229.04

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.34E+03	3.37	0.74	2.05	1.84	6.91	6.21	0.189	0.755	10.60	2.65	36.62	16.47	25.43	6.36	87.89	39.52
2	22.50	24	2.96E+07	4.91E-02	3.48E+03	3.34	0.75	2.05	1.84	6.86	6.17	0.184	0.737	10.86	2.71	37.22	16.74	26.06	6.52	89.34	40.18
3	24.00	25	2.96E+07	4.91E-02	3.59E+03	3.32	0.75	2.05	1.84	6.81	6.13	0.181	0.722	11.07	2.77	37.71	16.96	26.58	6.64	90.51	40.71
4	25.50	26	2.96E+07	4.91E-02	3.68E+03	3.31	0.76	2.05	1.84	6.77	6.10	0.178	0.711	11.25	2.81	38.12	17.15	27.01	6.75	91.49	41.16
5	27.00	26	2.96E+07	4.91E-02	3.76E+03	3.29	0.76	2.05	1.84	6.74	6.07	0.175	0.702	11.40	2.85	38.45	17.30	27.37	6.84	92.29	41.53
6	28.50	27	2.96E+07	4.91E-02	3.82E+03	3.28	0.76	2.05	1.84	6.72	6.05	0.173	0.694	11.53	2.88	38.74	17.43	27.67	6.92	92.97	41.84
7	30.00	27	2.96E+07	4.91E-02	3.87E+03	3.27	0.76	2.05	1.84	6.70	6.03	0.172	0.688	11.63	2.91	38.96	17.53	27.91	6.98	93.50	42.08

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-99	-
Chainage	10+428	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	230.67	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	13.40	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-99	1.20	22.00	19.50	19.50	461.94	190.08	13.87	3.47
BH-99	1.20	23.50	21.00	21.00	489.36	211.65	14.21	3.55
BH-99	1.20	25.00	22.50	22.50	516.78	233.22	14.49	3.62
BH-99	1.20	26.50	24.00	24.00	544.19	254.78	14.73	3.68
BH-99	1.20	28.00	25.50	25.50	571.61	276.35	14.92	3.73
BH-99	1.20	29.50	27.00	27.00	599.03	297.92	15.08	3.77
BH-99	1.20	30.00	27.50	27.50	608.17	305.11	15.21	3.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	13.24	26.48	5.65	3.15	39.01	42.16	16.86	7.21
2	4.00	5.50	1.50	Granular	17.65	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	39.71	52.95	5.65	9.44	68.41	80.99	32.40	12.23
3	5.50	7.00	1.50	Granular	18.15	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	66.56	80.18	5.65	15.82	98.91	127.32	50.93	19.04
4	7.00	8.50	1.50	Granular	18.15	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	93.79	107.40	5.65	22.30	129.13	179.84	71.94	27.66
5	8.50	10.00	1.50	Granular	18.15	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	121.01	134.63	5.65	32.36	253.97	337.04	134.81	39.09
6	10.00	11.50	1.50	Granular	18.15	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	148.24	161.85	5.65	39.64	301.88	424.59	169.84	52.57
7	11.50	13.00	1.50	Granular	18.15	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	175.46	189.08	5.65	50.40	453.72	626.83	250.73	69.06
8	13.00	14.50	1.50	Granular	8.34	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	195.33	201.59	5.65	56.11	470.56	699.78	279.91	87.14
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	208.86	216.13	5.65	59.99	505.39	794.61	317.85	106.32
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	223.40	230.67	5.65	64.17	538.61	892.00	356.80	126.66
11	17.50	19.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	230.67	230.67	5.65	66.26	538.61	958.26	383.30	147.59
12	19.00	20.50	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	230.67	230.67	5.65	66.26	538.61	1024.52	409.81	168.51
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	230.67	230.67	5.65	68.54	600.40	1154.85	461.94	190.08
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	230.67	230.67	5.65	68.54	600.40	1223.40	489.36	211.65
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	230.67	230.67	5.65	68.54	600.40	1291.94	516.78	233.22
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	230.67	230.67	5.65	68.54	600.40	1360.49	544.19	254.78
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	230.67	230.67	5.65	68.54	600.40	1429.03	571.61	276.35
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	230.67	230.67	5.65	68.54	600.40	1497.58	599.03	297.92
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	230.67	230.67	1.88	22.85	600.40	1520.42	608.17	305.11

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.34E+03	3.90	0.64	2.07	1.85	8.06	7.21	0.144	0.577	13.87	3.47	55.88	25.00	33.29	8.32	134.12	60.00
2	22.50	24	2.96E+07	1.02E-01	3.48E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.563	14.21	3.55	56.80	25.42	34.11	8.53	136.31	61.00
3	24.00	25	2.96E+07	1.02E-01	3.59E+03	3.84	0.65	2.07	1.85	7.94	7.11	0.138	0.552	14.49	3.62	57.54	25.75	34.78	8.70	138.09	61.81
4	25.50	26	2.96E+07	1.02E-01	3.68E+03	3.82	0.65	2.06	1.85	7.90	7.07	0.136	0.543	14.73	3.68	58.16	26.04	35.35	8.84	139.58	62.49
5	27.00	26	2.96E+07	1.02E-01	3.76E+03	3.81	0.66	2.06	1.85	7.86	7.04	0.134	0.536	14.92	3.73	58.67	26.27	35.81	8.95	140.80	63.04
6	28.50	27	2.96E+07	1.02E-01	3.82E+03	3.80	0.66	2.06	1.85	7.84	7.02	0.133	0.530	15.08	3.77	59.09	26.46	36.20	9.05	141.82	63.51
7	30.00	27	2.96E+07	1.02E-01	3.87E+03	3.79	0.66	2.06	1.85	7.81	7.00	0.131	0.526	15.21	3.80	59.43	26.61	36.51	9.13	142.63	63.87

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-100	-
Chainage	10+542	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	195.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.80	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-100	1.00	22.00	19.50	16.50	287.40	136.77	9.78	2.44
BH-100	1.00	23.50	21.00	18.00	306.09	151.50	9.95	2.49
BH-100	1.00	25.00	22.50	19.50	339.95	166.69	10.40	2.60
BH-100	1.00	26.50	24.00	21.00	359.29	181.87	10.78	2.69
BH-100	1.00	28.00	25.50	22.50	378.62	197.06	11.09	2.77
BH-100	1.00	29.50	27.00	24.00	397.96	212.24	11.37	2.84
BH-100	1.00	30.00	27.50	24.50	404.41	217.30	11.59	2.90

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.60	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.45	24.90	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.15	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	37.76	50.63	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.15	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	63.49	76.35	4.71	13.63	87.43	101.06	40.42	11.51
4	7.00	8.50	1.50	Granular	17.15	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.21	102.08	4.71	19.15	114.18	146.95	58.78	18.52
5	8.50	10.00	1.50	Granular	17.15	0.07	25	-	10.00	10.88	1.00	-	9.25	10.00	114.94	127.80	4.71	23.72	116.36	172.85	69.14	26.81
6	10.00	11.50	1.50	Granular	18.30	0.07	25	-	10.00	10.88	1.00	-	10.75	11.50	141.53	155.25	4.71	29.20	140.35	226.05	90.42	36.64
7	11.50	13.00	1.50	Granular	18.30	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	168.98	182.70	4.71	39.05	267.89	392.64	157.05	49.22
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	188.96	195.22	4.71	43.67	279.30	447.72	179.09	63.10
9	14.50	16.00	1.50	Granular	8.34	0.02	30	-	19.50	22.44	1.00	-	15.25	16.00	195.22	195.22	4.71	48.34	351.70	568.46	227.39	78.29
10	16.00	17.50	1.50	Granular	8.34	0.02	30	-	19.50	22.44	1.00	-	16.75	17.50	195.22	195.22	4.71	48.34	351.70	616.80	246.72	93.47
11	17.50	19.00	1.50	Granular	9.69	0.11	28	-	15.70	17.82	1.00	-	18.25	19.00	195.22	195.22	4.71	45.12	280.14	590.36	236.14	107.75
12	19.00	20.50	1.50	Granular	9.69	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	195.22	195.22	4.71	45.12	280.14	635.48	254.19	122.04
13	20.50	22.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	21.25	22.00	195.22	195.22	4.71	46.73	316.44	718.51	287.40	136.77
14	22.00	23.50	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	22.75	23.50	195.22	195.22	4.71	46.73	316.44	765.24	306.09	151.50
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	195.22	195.22	4.71	48.34	352.74	849.88	339.95	166.69
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	195.22	195.22	4.71	48.34	352.74	898.22	359.29	181.87
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	195.22	195.22	4.71	48.34	352.74	946.56	378.62	197.06
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	195.22	195.22	4.71	48.34	352.74	994.90	397.96	212.24
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	195.22	195.22	1.57	16.11	352.74	1011.01	404.41	217.30

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.33E+03	3.62	1.52	1.96	1.82	7.10	6.58	0.205	0.818	9.78	2.44	34.70	16.07	23.46	5.87	83.29	38.58
2	22.50	17	2.96E+07	4.91E-02	2.40E+03	3.60	1.53	1.96	1.82	7.06	6.54	0.201	0.804	9.95	2.49	35.11	16.27	23.88	5.97	84.27	39.04
3	24.00	18	2.96E+07	4.91E-02	2.57E+03	3.55	1.55	1.96	1.82	6.96	6.45	0.192	0.769	10.40	2.60	36.16	16.76	24.95	6.24	86.78	40.23
4	25.50	19	2.96E+07	4.91E-02	2.71E+03	3.51	1.57	1.96	1.81	6.87	6.38	0.186	0.742	10.78	2.69	37.03	17.18	25.86	6.47	88.88	41.22
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.09	2.77	37.76	17.52	26.63	6.66	90.62	42.05
6	28.50	21	2.96E+07	4.91E-02	2.95E+03	3.46	1.59	1.95	1.81	6.75	6.27	0.176	0.704	11.37	2.84	38.37	17.81	27.28	6.82	92.09	42.75
7	30.00	21	2.96E+07	4.91E-02	3.04E+03	3.43	1.60	1.95	1.81	6.71	6.23	0.173	0.690	11.59	2.90	38.88	18.05	27.82	6.95	93.30	43.32

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-100	-
Chainage	10+542	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	220.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.80	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-100	1.20	22.00	19.50	16.50	410.31	177.91	12.70	3.18
BH-100	1.20	23.50	21.00	18.00	435.62	198.00	12.92	3.23
BH-100	1.20	25.00	22.50	19.50	485.42	218.70	13.51	3.38
BH-100	1.20	26.50	24.00	21.00	511.60	239.40	14.00	3.50
BH-100	1.20	28.00	25.50	22.50	537.78	260.10	14.41	3.60
BH-100	1.20	29.50	27.00	24.00	563.96	280.80	14.77	3.69
BH-100	1.20	30.00	27.50	24.50	572.68	287.70	15.06	3.76

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.60	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	12.45	24.90	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.15	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	37.76	50.63	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.15	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	63.49	76.35	5.65	16.35	128.22	144.57	57.83	15.66
4	7.00	8.50	1.50	Granular	17.15	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	89.21	102.08	5.65	22.98	166.74	206.07	82.43	24.47
5	8.50	10.00	1.50	Granular	17.15	0.07	25	-	10.00	10.88	1.00	-	9.25	10.00	114.94	127.80	5.65	28.46	169.50	237.29	94.92	34.81
6	10.00	11.50	1.50	Granular	18.30	0.07	25	-	10.00	10.88	1.00	-	10.75	11.50	141.53	155.25	5.65	35.05	204.19	307.02	122.81	47.00
7	11.50	13.00	1.50	Granular	18.30	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	168.98	182.70	5.65	46.86	389.02	538.72	215.49	62.50
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	188.96	195.22	5.65	52.41	403.68	605.79	242.31	79.55
9	14.50	16.00	1.50	Granular	8.34	0.02	30	-	19.50	22.44	1.00	-	15.25	16.00	201.47	207.73	5.65	59.87	540.18	802.15	320.86	98.69
10	16.00	17.50	1.50	Granular	8.34	0.02	30	-	19.50	22.44	1.00	-	16.75	17.50	213.99	220.25	5.65	63.59	572.05	897.61	359.04	118.87
11	17.50	19.00	1.50	Granular	9.69	0.11	28	-	15.70	17.82	1.00	-	18.25	19.00	220.25	220.25	5.65	61.08	455.74	842.39	336.95	138.34
12	19.00	20.50	1.50	Granular	9.69	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	220.25	220.25	5.65	61.08	455.74	903.47	361.39	157.82
13	20.50	22.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	21.25	22.00	220.25	220.25	5.65	63.27	514.79	1025.79	410.31	177.91
14	22.00	23.50	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	22.75	23.50	220.25	220.25	5.65	63.27	514.79	1089.05	435.62	198.00
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	220.25	220.25	5.65	65.45	573.85	1213.55	485.42	218.70
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	220.25	220.25	5.65	65.45	573.85	1279.00	511.60	239.40
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	220.25	220.25	5.65	65.45	573.85	1344.44	537.78	260.10
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	220.25	220.25	5.65	65.45	573.85	1409.89	563.96	280.80
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	220.25	220.25	1.88	21.82	573.85	1431.70	572.68	287.70

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.33E+03	4.19	1.31	1.98	1.82	8.30	7.64	0.157	0.630	12.70	3.18	52.69	24.25	30.48	7.62	126.46	58.19
2	22.50	17	2.96E+07	1.02E-01	2.40E+03	4.17	1.32	1.98	1.82	8.25	7.59	0.155	0.619	12.92	3.23	53.31	24.54	31.02	7.75	127.94	58.89
3	24.00	18	2.96E+07	1.02E-01	2.57E+03	4.11	1.34	1.98	1.82	8.13	7.49	0.148	0.592	13.51	3.38	54.90	25.28	32.41	8.10	131.75	60.68
4	25.50	19	2.96E+07	1.02E-01	2.71E+03	4.06	1.35	1.98	1.82	8.03	7.40	0.143	0.571	14.00	3.50	56.23	25.91	33.60	8.40	134.94	62.18
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.96	7.33	0.139	0.555	14.41	3.60	57.32	26.42	34.59	8.65	137.58	63.42
6	28.50	21	2.96E+07	1.02E-01	2.95E+03	4.00	1.38	1.97	1.82	7.89	7.28	0.135	0.542	14.77	3.69	58.26	26.86	35.44	8.86	139.82	64.48
7	30.00	21	2.96E+07	1.02E-01	3.04E+03	3.97	1.38	1.97	1.82	7.84	7.23	0.133	0.531	15.06	3.76	59.02	27.23	36.14	9.03	141.66	65.34

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-91	-
Chainage	9+626	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	93.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-91	1.00	22.00	19.50	18.00	144.77	77.28	9.83	2.46
BH-91	1.00	23.50	21.00	19.50	154.00	85.39	9.95	2.49
BH-91	1.00	25.00	22.50	21.00	163.24	93.50	10.30	2.58
BH-91	1.00	26.50	24.00	22.50	172.47	101.61	10.60	2.65
BH-91	1.00	28.00	25.50	24.00	181.71	109.73	10.85	2.71
BH-91	1.00	29.50	27.00	25.50	190.94	117.84	11.07	2.77
BH-91	1.00	30.00	27.50	26.00	194.02	120.54	11.24	2.81

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.34	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	5.51	11.02	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.34	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	16.52	22.03	4.71	2.86	11.85	14.71	5.88	6.85
3	5.50	7.00	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	27.54	33.05	4.71	5.68	31.23	39.78	15.91	10.09
4	7.00	8.50	1.50	Granular	7.94	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	39.00	44.96	4.71	8.05	41.69	58.28	23.31	13.99
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	50.92	56.88	4.71	10.93	62.87	90.39	36.16	18.70
6	10.00	11.50	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	62.83	68.79	4.71	13.48	75.26	116.26	46.50	24.13
7	11.50	13.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	12.25	13.00	74.75	80.71	4.71	16.04	87.64	144.69	57.88	30.27
8	13.00	14.50	1.50	Granular	8.34	0.06	26	-	11.90	13.19	1.00	-	13.75	14.50	86.96	93.22	4.71	18.66	100.85	176.56	70.62	37.14
9	14.50	16.00	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	93.22	93.22	4.71	22.31	153.68	251.71	100.68	45.04
10	16.00	17.50	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	93.22	93.22	4.71	22.31	153.68	274.03	109.61	52.94
11	17.50	19.00	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	93.22	93.22	4.71	23.08	171.30	314.72	125.89	61.05
12	19.00	20.50	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	93.22	93.22	4.71	23.08	171.30	337.81	135.12	69.16
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	93.22	93.22	4.71	23.08	172.34	361.93	144.77	77.28
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	93.22	93.22	4.71	23.08	172.34	385.01	154.00	85.39
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	93.22	93.22	4.71	23.08	172.34	408.10	163.24	93.50
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	93.22	93.22	4.71	23.08	172.34	431.18	172.47	101.61
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	93.22	93.22	4.71	23.08	172.34	454.26	181.71	109.73
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	93.22	93.22	4.71	23.08	172.34	477.35	190.94	117.84
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	93.22	93.22	1.57	7.69	172.34	485.04	194.02	120.54

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)		L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.60E+03	3.54	1.13	2.00	1.83	7.09	6.48	0.203	0.814	9.83	2.46	34.84	15.93	23.60	5.90	83.62	38.23
2	22.50	19	2.96E+07	4.91E-02	2.65E+03	3.53	1.13	2.00	1.83	7.06	6.46	0.201	0.804	9.95	2.49	35.11	16.05	23.87	5.97	84.25	38.52
3	24.00	20	2.96E+07	4.91E-02	2.80E+03	3.49	1.15	2.00	1.83	6.98	6.38	0.194	0.777	10.30	2.58	35.94	16.44	24.72	6.18	86.25	39.45
4	25.50	21	2.96E+07	4.91E-02	2.93E+03	3.46	1.16	2.00	1.83	6.91	6.32	0.189	0.754	10.60	2.65	36.64	16.77	25.45	6.36	87.93	40.24
5	27.00	21	2.96E+07	4.91E-02	3.04E+03	3.43	1.16	2.00	1.83	6.86	6.28	0.184	0.737	10.85	2.71	37.21	17.03	26.05	6.51	89.30	40.88
6	28.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.07	2.77	37.69	17.26	26.56	6.64	90.46	41.42
7	30.00	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.18	1.99	1.83	6.78	6.21	0.178	0.712	11.24	2.81	38.08	17.44	26.97	6.74	91.39	41.85

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-91	-
Chainage	9+626	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	118.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-91	1.20	22.00	19.50	18.00	228.43	106.80	12.80	3.20
BH-91	1.20	23.50	21.00	19.50	242.49	119.01	12.95	3.24
BH-91	1.20	25.00	22.50	21.00	256.54	131.23	13.41	3.35
BH-91	1.20	26.50	24.00	22.50	270.60	143.44	13.80	3.45
BH-91	1.20	28.00	25.50	24.00	284.65	155.65	14.12	3.53
BH-91	1.20	29.50	27.00	25.50	298.71	167.87	14.40	3.60
BH-91	1.20	30.00	27.50	26.00	303.39	171.94	14.62	3.66

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.34	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	5.51	11.02	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.34	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	16.52	22.03	5.65	3.44	17.22	20.66	8.26	9.67
3	5.50	7.00	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	27.54	33.05	5.65	6.82	45.81	56.07	22.43	13.96
4	7.00	8.50	1.50	Granular	7.94	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	39.00	44.96	5.65	9.66	60.93	80.85	32.34	19.03
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	50.92	56.88	5.65	13.11	91.60	124.63	49.85	25.08
6	10.00	11.50	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	62.83	68.79	5.65	16.18	109.44	158.65	63.46	31.99
7	11.50	13.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	12.25	13.00	74.75	80.71	5.65	19.25	127.28	195.74	78.30	39.75
8	13.00	14.50	1.50	Granular	8.34	0.06	26	-	11.90	13.19	1.00	-	13.75	14.50	86.96	93.22	5.65	22.40	146.35	237.20	94.88	48.40
9	14.50	16.00	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	99.48	105.74	5.65	28.57	251.57	370.99	148.40	58.77
10	16.00	17.50	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	111.99	118.25	5.65	32.17	280.16	431.76	172.70	70.16
11	17.50	19.00	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	118.25	118.25	5.65	35.14	312.27	499.01	199.60	82.37
12	19.00	20.50	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	118.25	118.25	5.65	35.14	312.27	534.14	213.66	94.58
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	118.25	118.25	5.65	35.14	314.06	571.08	228.43	106.80
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	118.25	118.25	5.65	35.14	314.06	606.21	242.49	119.01
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	118.25	118.25	5.65	35.14	314.06	641.35	256.54	131.23
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	118.25	118.25	5.65	35.14	314.06	676.49	270.60	143.44
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	118.25	118.25	5.65	35.14	314.06	711.63	284.65	155.65
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	118.25	118.25	5.65	35.14	314.06	746.77	298.71	167.87
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	118.25	118.25	1.88	11.71	314.06	758.48	303.39	171.94

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)		L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.60E+03	4.10	0.98	2.02	1.83	8.28	7.52	0.156	0.625	12.80	3.20	52.97	24.07	30.72	7.68	127.13	57.76
2	22.50	19	2.96E+07	1.02E-01	2.65E+03	4.08	0.98	2.02	1.83	8.24	7.49	0.154	0.618	12.95	3.24	53.37	24.25	31.07	7.77	128.09	58.21
3	24.00	20	2.96E+07	1.02E-01	2.80E+03	4.04	0.99	2.02	1.83	8.15	7.41	0.149	0.597	13.41	3.35	54.63	24.84	32.18	8.05	131.11	59.61
4	25.50	21	2.96E+07	1.02E-01	2.93E+03	4.00	1.00	2.02	1.83	8.07	7.34	0.145	0.580	13.80	3.45	55.69	25.33	33.12	8.28	133.66	60.79
5	27.00	21	2.96E+07	1.02E-01	3.04E+03	3.97	1.01	2.02	1.83	8.01	7.29	0.142	0.566	14.12	3.53	56.56	25.73	33.90	8.47	135.73	61.75
6	28.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.40	3.60	57.29	26.07	34.56	8.64	137.50	62.57
7	30.00	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.02	2.01	1.83	7.92	7.21	0.137	0.547	14.62	3.66	57.88	26.34	35.09	8.77	138.90	63.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-92	-
Chainage	9+737	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	90.00	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-92	1.00	22.00	19.50	16.50	124.13	74.23	10.38	2.59
BH-92	1.00	23.50	21.00	18.00	132.45	81.70	10.60	2.65
BH-92	1.00	25.00	22.50	19.50	147.88	89.38	10.82	2.71
BH-92	1.00	26.50	24.00	21.00	156.50	97.06	11.08	2.77
BH-92	1.00	28.00	25.50	22.50	165.12	104.74	11.37	2.84
BH-92	1.00	29.50	27.00	24.00	173.74	112.42	11.61	2.90
BH-92	1.00	30.00	27.50	24.50	176.61	114.98	11.80	2.95

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.34	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.51	11.02	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.41	21.81	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.09	27	-	13.80	15.50	1.00	-	6.25	7.00	27.20	32.60	4.71	6.06	43.75	49.81	19.92	9.39
4	7.00	8.50	1.50	Granular	7.19	0.09	27	-	13.80	15.50	1.00	-	7.75	8.50	37.99	43.39	4.71	8.47	56.93	71.46	28.58	13.41
5	8.50	10.00	1.50	Granular	7.19	0.09	27	-	13.80	15.50	1.00	-	9.25	10.00	48.78	54.18	4.71	10.87	70.12	95.52	38.21	18.11
6	10.00	11.50	1.50	Granular	7.19	0.09	27	-	13.80	15.50	1.00	-	10.75	11.50	59.57	64.97	4.71	13.28	83.30	121.98	48.79	23.47
7	11.50	13.00	1.50	Granular	8.34	0.09	27	-	13.80	15.50	1.00	-	12.25	13.00	71.22	77.48	4.71	15.87	99.22	153.77	61.51	29.57
8	13.00	14.50	1.50	Granular	8.34	0.09	27	-	13.80	15.50	1.00	-	13.75	14.50	83.74	90.00	4.71	18.66	114.52	187.73	75.09	36.44
9	14.50	16.00	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	90.00	90.00	4.71	21.54	148.57	243.32	97.33	44.12
10	16.00	17.50	1.50	Granular	8.49	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	90.00	90.00	4.71	21.54	148.67	264.97	105.99	51.81
11	17.50	19.00	1.50	Granular	8.49	0.08	28	-	15.70	17.82	1.00	-	18.25	19.00	90.00	90.00	4.71	20.80	131.64	268.73	107.49	59.28
12	19.00	20.50	1.50	Granular	8.49	0.08	28	-	15.70	17.82	1.00	-	19.75	20.50	90.00	90.00	4.71	20.80	131.64	289.53	115.81	66.75
13	20.50	22.00	1.50	Granular	8.49	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	90.00	90.00	4.71	20.80	131.64	310.33	124.13	74.23
14	22.00	23.50	1.50	Granular	8.49	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	90.00	90.00	4.71	20.80	131.64	331.13	132.45	81.70
15	23.50	25.00	1.50	Granular	8.49	0.05	29	-	17.60	20.13	1.00	-	24.25	25.00	90.00	90.00	4.71	21.54	148.67	369.71	147.88	89.38
16	25.00	26.50	1.50	Granular	8.49	0.05	29	-	17.60	20.13	1.00	-	25.75	26.50	90.00	90.00	4.71	21.54	148.67	391.25	156.50	97.06
17	26.50	28.00	1.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	27.25	28.00	90.00	90.00	4.71	21.54	148.67	412.80	165.12	104.74
18	28.00	29.50	1.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	28.75	29.50	90.00	90.00	4.71	21.54	148.67	434.34	173.74	112.42
19	29.50	30.00	0.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	29.75	30.00	90.00	90.00	1.57	7.18	148.67	441.52	176.61	114.98

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.56E+03	3.55	1.55	1.96	1.82	6.96	6.45	0.193	0.771	10.38	2.59	36.12	16.74	24.91	6.23	86.68	40.18
2	22.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.56	1.96	1.82	6.91	6.41	0.189	0.755	10.60	2.65	36.62	16.98	25.43	6.36	87.89	40.75
3	24.00	19	2.96E+07	4.91E-02	2.73E+03	3.51	1.57	1.96	1.81	6.86	6.37	0.185	0.739	10.82	2.71	37.14	17.23	25.98	6.49	89.14	41.35
4	25.50	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.722	11.08	2.77	37.74	17.51	26.60	6.65	90.57	42.02
5	27.00	21	2.96E+07	4.91E-02	2.95E+03	3.46	1.59	1.95	1.81	6.75	6.27	0.176	0.704	11.37	2.84	38.37	17.81	27.28	6.82	92.10	42.75
6	28.50	21	2.96E+07	4.91E-02	3.05E+03	3.43	1.60	1.95	1.81	6.71	6.23	0.172	0.689	11.61	2.90	38.91	18.07	27.86	6.96	93.39	43.36
7	30.00	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.61	1.95	1.81	6.67	6.19	0.169	0.678	11.80	2.95	39.35	18.27	28.32	7.08	94.43	43.85

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-92	-
Chainage	9+737	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	115.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-92	1.20	22.00	19.50	16.50	193.92	102.78	13.48	3.37
BH-92	1.20	23.50	21.00	18.00	206.71	114.11	13.77	3.44
BH-92	1.20	25.00	22.50	19.50	232.49	125.75	14.06	3.52
BH-92	1.20	26.50	24.00	21.00	245.73	137.40	14.40	3.60
BH-92	1.20	28.00	25.50	22.50	258.97	149.04	14.77	3.69
BH-92	1.20	29.50	27.00	24.00	272.22	160.68	15.08	3.77
BH-92	1.20	30.00	27.50	24.50	276.63	164.57	15.33	3.83

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.34	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.51	11.02	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	16.41	21.81	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.09	27	-	13.80	15.50	1.00	-	6.25	7.00	27.20	32.60	5.65	7.27	64.12	71.39	28.56	13.12
4	7.00	8.50	1.50	Granular	7.19	0.09	27	-	13.80	15.50	1.00	-	7.75	8.50	37.99	43.39	5.65	10.16	83.11	100.54	40.22	18.34
5	8.50	10.00	1.50	Granular	7.19	0.09	27	-	13.80	15.50	1.00	-	9.25	10.00	48.78	54.18	5.65	13.05	102.10	132.58	53.03	24.37
6	10.00	11.50	1.50	Granular	7.19	0.09	27	-	13.80	15.50	1.00	-	10.75	11.50	59.57	64.97	5.65	15.93	121.08	167.50	67.00	31.20
7	11.50	13.00	1.50	Granular	8.34	0.09	27	-	13.80	15.50	1.00	-	12.25	13.00	71.22	77.48	5.65	19.05	144.19	209.65	83.86	38.91
8	13.00	14.50	1.50	Granular	8.34	0.09	27	-	13.80	15.50	1.00	-	13.75	14.50	83.74	90.00	5.65	22.39	166.21	254.07	101.63	47.56
9	14.50	16.00	1.50	Granular	8.34	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	96.25	102.51	5.65	27.65	244.20	359.70	143.88	57.67
10	16.00	17.50	1.50	Granular	8.49	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	108.88	115.25	5.65	31.28	273.48	420.26	168.10	68.81
11	17.50	19.00	1.50	Granular	8.49	0.08	28	-	15.70	17.82	1.00	-	18.25	19.00	115.25	115.25	5.65	31.96	242.14	420.88	168.35	80.13
12	19.00	20.50	1.50	Granular	8.49	0.08	28	-	15.70	17.82	1.00	-	19.75	20.50	115.25	115.25	5.65	31.96	242.14	452.85	181.14	91.46
13	20.50	22.00	1.50	Granular	8.49	0.10	28	-	15.70	17.82	1.00	-	21.25	22.00	115.25	115.25	5.65	31.96	242.14	484.81	193.92	102.78
14	22.00	23.50	1.50	Granular	8.49	0.10	28	-	15.70	17.82	1.00	-	22.75	23.50	115.25	115.25	5.65	31.96	242.14	516.77	206.71	114.11
15	23.50	25.00	1.50	Granular	8.49	0.05	29	-	17.60	20.13	1.00	-	24.25	25.00	115.25	115.25	5.65	33.11	273.48	581.22	232.49	125.75
16	25.00	26.50	1.50	Granular	8.49	0.05	29	-	17.60	20.13	1.00	-	25.75	26.50	115.25	115.25	5.65	33.11	273.48	614.33	245.73	137.40
17	26.50	28.00	1.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	27.25	28.00	115.25	115.25	5.65	33.11	273.48	647.43	258.97	149.04
18	28.00	29.50	1.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	28.75	29.50	115.25	115.25	5.65	33.11	273.48	680.54	272.22	160.68
19	29.50	30.00	0.50	Granular	8.49	0.14	29	-	17.60	20.13	1.00	-	29.75	30.00	115.25	115.25	1.88	11.04	273.48	691.57	276.63	164.57

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.56E+03	4.11	1.34	1.98	1.82	8.13	7.49	0.148	0.593	13.48	3.37	54.83	25.25	32.36	8.09	131.60	60.61
2	22.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.35	1.98	1.82	8.08	7.44	0.145	0.581	13.77	3.44	55.60	25.61	33.04	8.26	133.43	61.47
3	24.00	19	2.96E+07	1.02E-01	2.73E+03	4.06	1.35	1.98	1.82	8.02	7.39	0.142	0.569	14.06	3.52	56.39	25.99	33.75	8.44	135.33	62.37
4	25.50	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.96	7.34	0.139	0.556	14.40	3.60	57.29	26.41	34.56	8.64	137.50	63.39
5	27.00	21	2.96E+07	1.02E-01	2.95E+03	4.00	1.38	1.97	1.82	7.89	7.28	0.135	0.542	14.77	3.69	58.26	26.87	35.44	8.86	139.82	64.48
6	28.50	21	2.96E+07	1.02E-01	3.05E+03	3.97	1.38	1.97	1.82	7.84	7.23	0.133	0.531	15.08	3.77	59.08	27.25	36.19	9.05	141.79	65.40
7	30.00	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.39	1.97	1.82	7.79	7.19	0.130	0.522	15.33	3.83	59.73	27.56	36.79	9.20	143.36	66.15

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-93	-
Chainage	9+820	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	90.30	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-93	1.00	22.00	19.50	16.50	140.45	75.70	10.35	2.59
BH-93	1.00	23.50	21.00	18.00	149.40	83.61	10.79	2.70
BH-93	1.00	25.00	22.50	19.50	158.34	91.52	11.16	2.79
BH-93	1.00	26.50	24.00	21.00	167.28	99.43	11.47	2.87
BH-93	1.00	28.00	25.50	22.50	176.23	107.34	11.72	2.93
BH-93	1.00	29.50	27.00	24.00	185.17	115.25	11.94	2.99
BH-93	1.00	30.00	27.50	24.50	188.15	117.89	12.12	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.79	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.10	10.19	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.34	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	15.70	21.21	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.34	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	26.71	32.22	4.71	5.73	36.95	42.68	17.07	9.30
4	7.00	8.50	1.50	Granular	7.34	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	37.73	43.24	4.71	8.10	48.40	62.23	24.89	13.22
5	8.50	10.00	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	48.74	54.25	4.71	10.06	49.42	73.31	29.32	17.68
6	10.00	11.50	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	59.76	65.27	4.71	12.33	58.86	95.08	38.03	22.79
7	11.50	13.00	1.50	Granular	8.34	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	71.52	77.78	4.71	16.53	114.39	167.14	66.86	29.06
8	13.00	14.50	1.50	Granular	8.34	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	84.04	90.30	4.71	19.42	131.96	204.14	81.65	36.15
9	14.50	16.00	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	15.25	16.00	90.30	90.30	4.71	22.36	166.12	260.66	104.26	44.06
10	16.00	17.50	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	16.75	17.50	90.30	90.30	4.71	22.36	166.12	283.02	113.21	51.97
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	90.30	90.30	4.71	22.36	167.16	306.41	122.57	59.88
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	90.30	90.30	4.71	22.36	167.16	328.77	131.51	67.79
13	20.50	22.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	90.30	90.30	4.71	22.36	167.16	351.13	140.45	75.70
14	22.00	23.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	90.30	90.30	4.71	22.36	167.16	373.49	149.40	83.61
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	90.30	90.30	4.71	22.36	167.16	395.85	158.34	91.52
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	90.30	90.30	4.71	22.36	167.16	418.21	167.28	99.43
17	26.50	28.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	90.30	90.30	4.71	22.36	167.16	440.57	176.23	107.34
18	28.00	29.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	90.30	90.30	4.71	22.36	167.16	462.93	185.17	115.25
19	29.50	30.00	0.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	90.30	90.30	1.57	7.45	167.16	470.38	188.15	117.89

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.55E+03	3.56	1.55	1.96	1.82	6.97	6.46	0.193	0.773	10.35	2.59	36.04	16.71	24.83	6.21	86.50	40.09
2	22.50	19	2.96E+07	4.91E-02	2.72E+03	3.51	1.57	1.96	1.81	6.87	6.37	0.185	0.741	10.79	2.70	37.07	17.19	25.90	6.47	88.96	41.26
3	24.00	20	2.96E+07	4.91E-02	2.86E+03	3.48	1.58	1.95	1.81	6.79	6.31	0.179	0.717	11.16	2.79	37.90	17.59	26.78	6.69	90.96	42.21
4	25.50	21	2.96E+07	4.91E-02	2.99E+03	3.45	1.60	1.95	1.81	6.73	6.25	0.174	0.698	11.47	2.87	38.60	17.92	27.52	6.88	92.64	43.01
5	27.00	22	2.96E+07	4.91E-02	3.09E+03	3.42	1.61	1.95	1.81	6.68	6.21	0.171	0.682	11.72	2.93	39.17	18.19	28.14	7.03	94.02	43.66
6	28.50	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.670	11.94	2.99	39.66	18.42	28.66	7.17	95.18	44.21
7	30.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.660	12.12	3.03	40.04	18.60	29.08	7.27	96.11	44.65

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-93	-
Chainage	9+820	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	115.33	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-93	1.20	22.00	19.50	16.50	222.85	104.98	13.44	3.36
BH-93	1.20	23.50	21.00	18.00	236.56	116.95	14.02	3.50
BH-93	1.20	25.00	22.50	19.50	250.27	128.92	14.49	3.62
BH-93	1.20	26.50	24.00	21.00	263.97	140.89	14.90	3.72
BH-93	1.20	28.00	25.50	22.50	277.68	152.86	15.23	3.81
BH-93	1.20	29.50	27.00	24.00	291.39	164.83	15.51	3.88
BH-93	1.20	30.00	27.50	24.50	295.96	168.82	15.74	3.94

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.79	0.01	22	-	4.00	7.59	1.00	-	3.25	4.00	5.10	10.19	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.34	0.01	22	-	4.00	7.59	1.00	-	4.75	5.50	15.70	21.21	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.34	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	26.71	32.22	5.65	6.88	54.20	61.08	24.43	13.01
4	7.00	8.50	1.50	Granular	7.34	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	37.73	43.24	5.65	9.72	70.69	87.28	34.91	18.11
5	8.50	10.00	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	48.74	54.25	5.65	12.07	72.00	100.66	40.26	23.86
6	10.00	11.50	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	59.76	65.27	5.65	14.80	85.60	129.06	51.62	30.38
7	11.50	13.00	1.50	Granular	8.34	0.03	28	-	15.70	17.82	1.00	-	12.25	13.00	71.52	77.78	5.65	19.84	166.21	229.51	91.80	38.31
8	13.00	14.50	1.50	Granular	8.34	0.03	28	-	15.70	17.82	1.00	-	13.75	14.50	84.04	90.30	5.65	23.31	191.52	278.12	111.25	47.21
9	14.50	16.00	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	15.25	16.00	96.55	102.81	5.65	28.69	272.94	388.24	155.30	57.62
10	16.00	17.50	1.50	Granular	8.34	0.04	30	-	19.50	22.44	1.00	-	16.75	17.50	109.07	115.33	5.65	32.41	304.82	452.53	181.01	69.07
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	115.33	115.33	5.65	34.27	306.61	488.59	195.44	81.04
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	115.33	115.33	5.65	34.27	306.61	522.86	209.14	93.01
13	20.50	22.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	115.33	115.33	5.65	34.27	306.61	557.13	222.85	104.98
14	22.00	23.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	115.33	115.33	5.65	34.27	306.61	591.40	236.56	116.95
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	115.33	115.33	5.65	34.27	306.61	625.67	250.27	128.92
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	115.33	115.33	5.65	34.27	306.61	659.93	263.97	140.89
17	26.50	28.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	115.33	115.33	5.65	34.27	306.61	694.20	277.68	152.86
18	28.00	29.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	115.33	115.33	5.65	34.27	306.61	728.47	291.39	164.83
19	29.50	30.00	0.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	115.33	115.33	1.88	11.42	306.61	739.90	295.96	168.82

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.55E+03	4.12	1.34	1.98	1.82	8.14	7.50	0.149	0.595	13.44	3.36	54.72	25.20	32.26	8.06	131.32	60.48
2	22.50	19	2.96E+07	1.02E-01	2.72E+03	4.06	1.35	1.98	1.82	8.03	7.40	0.143	0.571	14.02	3.50	56.28	25.93	33.64	8.41	135.06	62.24
3	24.00	20	2.96E+07	1.02E-01	2.86E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.552	14.49	3.62	57.54	26.53	34.79	8.70	138.10	63.67
4	25.50	21	2.96E+07	1.02E-01	2.99E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.537	14.90	3.72	58.60	27.03	35.75	8.94	140.65	64.87
5	27.00	22	2.96E+07	1.02E-01	3.09E+03	3.96	1.39	1.97	1.82	7.81	7.21	0.131	0.525	15.23	3.81	59.47	27.44	36.55	9.14	142.74	65.85
6	28.50	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.516	15.51	3.88	60.21	27.78	37.23	9.31	144.50	66.68
7	30.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.508	15.74	3.94	60.80	28.06	37.78	9.44	145.91	67.34

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-95	-
Chainage	10+044	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	91.12	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-95	1.00	22.00	19.50	16.50	126.29	75.29	10.43	2.61
BH-95	1.00	23.50	21.00	18.00	134.72	82.84	10.56	2.64
BH-95	1.00	25.00	22.50	19.50	157.53	90.81	10.95	2.74
BH-95	1.00	26.50	24.00	21.00	166.93	98.77	11.27	2.82
BH-95	1.00	28.00	25.50	22.50	175.95	106.74	11.54	2.89
BH-95	1.00	29.50	27.00	24.00	184.98	114.71	11.77	2.94
BH-95	1.00	30.00	27.50	24.50	187.99	117.36	11.96	2.99

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.34	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.51	11.02	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.34	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	16.52	22.03	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	27.54	33.05	4.71	5.68	31.23	36.92	14.77	9.29
4	7.00	8.50	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	38.55	44.06	4.71	7.96	40.68	54.32	21.73	13.16
5	8.50	10.00	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	49.57	55.08	4.71	10.23	50.13	73.99	29.60	17.68
6	10.00	11.50	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	60.58	66.09	4.71	12.50	59.57	95.94	38.38	22.83
7	11.50	13.00	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	72.35	78.61	4.71	16.72	115.55	168.64	67.45	29.16
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	84.86	91.12	4.71	19.61	133.12	205.83	82.33	36.30
9	14.50	16.00	1.50	Granular	8.34	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	91.12	91.12	4.71	21.81	150.35	244.87	97.95	44.06
10	16.00	17.50	1.50	Granular	8.34	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	91.12	91.12	4.71	21.81	150.35	266.68	106.67	51.81
11	17.50	19.00	1.50	Granular	8.34	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	91.12	91.12	4.71	22.56	167.58	306.47	122.59	59.78
12	19.00	20.50	1.50	Granular	8.34	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	91.12	91.12	4.71	22.56	167.58	329.04	131.62	67.75
13	20.50	22.00	1.50	Granular	8.49	0.12	28	-	15.70	17.82	1.00	-	21.25	22.00	91.12	91.12	4.71	21.06	133.22	315.73	126.29	75.29
14	22.00	23.50	1.50	Granular	8.49	0.12	28	-	15.70	17.82	1.00	-	22.75	23.50	91.12	91.12	4.71	21.06	133.22	336.79	134.72	82.84
15	23.50	25.00	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	91.12	91.12	4.71	22.56	167.70	393.84	157.53	90.81
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	91.12	91.12	4.71	22.56	168.62	417.32	166.93	98.77
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	91.12	91.12	4.71	22.56	168.62	439.89	175.95	106.74
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	91.12	91.12	4.71	22.56	168.62	462.45	184.98	114.71
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	91.12	91.12	1.57	7.52	168.62	469.97	187.99	117.36

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.58E+03	3.55	1.55	1.96	1.82	6.95	6.44	0.192	0.767	10.43	2.61	36.23	16.79	25.02	6.26	86.94	40.31
2	22.50	19	2.96E+07	4.91E-02	2.63E+03	3.53	1.56	1.96	1.82	6.92	6.42	0.189	0.757	10.56	2.64	36.55	16.95	25.35	6.34	87.71	40.67
3	24.00	20	2.96E+07	4.91E-02	2.78E+03	3.50	1.57	1.96	1.81	6.84	6.34	0.183	0.731	10.95	2.74	37.42	17.36	26.27	6.57	89.82	41.67
4	25.50	20	2.96E+07	4.91E-02	2.91E+03	3.46	1.59	1.95	1.81	6.77	6.28	0.177	0.710	11.27	2.82	38.16	17.71	27.06	6.76	91.59	42.51
5	27.00	21	2.96E+07	4.91E-02	3.02E+03	3.44	1.60	1.95	1.81	6.72	6.24	0.173	0.693	11.54	2.89	38.77	18.00	27.70	6.93	93.04	43.19
6	28.50	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.67	6.20	0.170	0.680	11.77	2.94	39.28	18.24	28.25	7.06	94.27	43.78
7	30.00	22	2.96E+07	4.91E-02	3.19E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.167	0.669	11.96	2.99	39.69	18.43	28.69	7.17	95.25	44.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-95	-
Chainage	10+044	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	116.15	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-95	1.20	22.00	19.50	16.50	196.79	104.28	13.54	3.39
BH-95	1.20	23.50	21.00	18.00	209.68	115.68	13.72	3.43
BH-95	1.20	25.00	22.50	19.50	248.75	127.71	14.22	3.56
BH-95	1.20	26.50	24.00	21.00	263.19	139.75	14.64	3.66
BH-95	1.20	28.00	25.50	22.50	277.00	151.79	14.99	3.75
BH-95	1.20	29.50	27.00	24.00	290.80	163.83	15.29	3.82
BH-95	1.20	30.00	27.50	24.50	295.41	167.85	15.53	3.88

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.34	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.51	11.02	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.34	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	16.52	22.03	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	6.25	7.00	27.54	33.05	5.65	6.82	45.81	52.63	21.05	12.99
4	7.00	8.50	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	7.75	8.50	38.55	44.06	5.65	9.55	59.41	75.78	30.31	18.04
5	8.50	10.00	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	9.25	10.00	49.57	55.08	5.65	12.27	73.01	101.66	40.66	23.85
6	10.00	11.50	1.50	Granular	7.34	0.03	25	-	10.00	10.88	1.00	-	10.75	11.50	60.58	66.09	5.65	15.00	86.62	130.26	52.10	30.43
7	11.50	13.00	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	72.35	78.61	5.65	20.07	167.88	231.58	92.63	38.42
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	84.86	91.12	5.65	23.54	193.18	280.43	112.17	47.39
9	14.50	16.00	1.50	Granular	8.34	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	97.38	103.64	5.65	27.97	246.77	361.98	144.79	57.59
10	16.00	17.50	1.50	Granular	8.34	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	109.89	116.15	5.65	31.57	275.36	422.14	168.86	68.81
11	17.50	19.00	1.50	Granular	8.34	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	116.15	116.15	5.65	34.51	306.92	488.22	195.29	80.85
12	19.00	20.50	1.50	Granular	8.34	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	116.15	116.15	5.65	34.51	306.92	522.73	209.09	92.89
13	20.50	22.00	1.50	Granular	8.49	0.12	28	-	15.70	17.82	1.00	-	21.25	22.00	116.15	116.15	5.65	32.21	243.96	491.98	196.79	104.28
14	22.00	23.50	1.50	Granular	8.49	0.12	28	-	15.70	17.82	1.00	-	22.75	23.50	116.15	116.15	5.65	32.21	243.96	524.20	209.68	115.68
15	23.50	25.00	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	116.15	116.15	5.65	34.51	307.12	621.87	248.75	127.71
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	116.15	116.15	5.65	34.51	308.71	657.98	263.19	139.75
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	116.15	116.15	5.65	34.51	308.71	692.49	277.00	151.79
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	116.15	116.15	5.65	34.51	308.71	727.01	290.80	163.83
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	116.15	116.15	1.88	11.50	308.71	738.51	295.41	167.85

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.58E+03	4.11	1.34	1.98	1.82	8.12	7.48	0.148	0.591	13.54	3.39	55.00	25.33	32.51	8.13	132.00	60.80
2	22.50	19	2.96E+07	1.02E-01	2.63E+03	4.09	1.34	1.98	1.82	8.09	7.45	0.146	0.583	13.72	3.43	55.48	25.56	32.94	8.23	133.16	61.34
3	24.00	20	2.96E+07	1.02E-01	2.78E+03	4.04	1.36	1.98	1.82	7.99	7.37	0.141	0.563	14.22	3.56	56.82	26.19	34.13	8.53	136.36	62.85
4	25.50	20	2.96E+07	1.02E-01	2.91E+03	4.01	1.37	1.97	1.82	7.91	7.30	0.137	0.546	14.64	3.66	57.94	26.72	35.15	8.79	139.05	64.12
5	27.00	21	2.96E+07	1.02E-01	3.02E+03	3.98	1.38	1.97	1.82	7.85	7.24	0.133	0.534	14.99	3.75	58.86	27.15	35.98	9.00	141.25	65.15
6	28.50	22	2.96E+07	1.02E-01	3.11E+03	3.95	1.39	1.97	1.82	7.80	7.20	0.131	0.523	15.29	3.82	59.63	27.51	36.70	9.17	143.12	66.03
7	30.00	22	2.96E+07	1.02E-01	3.19E+03	3.94	1.40	1.97	1.82	7.76	7.16	0.129	0.515	15.53	3.88	60.25	27.80	37.27	9.32	144.61	66.73

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-96	-
Chainage	10+125	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	96.67	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-96	1.00	22.00	19.50	16.50	149.95	79.19	10.33	2.58
BH-96	1.00	23.50	21.00	18.00	159.53	87.54	10.66	2.66
BH-96	1.00	25.00	22.50	19.50	169.10	95.90	11.06	2.76
BH-96	1.00	26.50	24.00	21.00	178.68	104.25	11.40	2.85
BH-96	1.00	28.00	25.50	22.50	188.25	112.60	11.69	2.92
BH-96	1.00	29.50	27.00	24.00	197.83	120.95	11.93	2.98
BH-96	1.00	30.00	27.50	24.50	201.02	123.74	12.14	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	5.88	11.77	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	17.65	23.53	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	29.41	35.30	4.71	5.83	29.69	35.51	14.21	9.33
4	7.00	8.50	1.50	Granular	7.94	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	41.25	47.21	4.71	8.17	38.91	52.90	21.16	13.27
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	53.17	59.13	4.71	11.41	65.21	90.61	36.25	18.11
6	10.00	11.50	1.50	Granular	8.34	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	65.38	71.64	4.71	14.03	78.41	117.85	47.14	23.69
7	11.50	13.00	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	77.90	84.16	4.71	18.00	123.34	180.79	72.31	30.38
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	90.41	96.67	4.71	20.90	140.92	219.26	87.70	37.88
9	14.50	16.00	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	96.67	96.67	4.71	23.14	160.09	261.58	104.63	46.01
10	16.00	17.50	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	96.67	96.67	4.71	23.14	160.09	284.72	113.89	54.14
11	17.50	19.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	96.67	96.67	4.71	23.94	178.44	327.00	130.80	62.49
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	96.67	96.67	4.71	23.94	178.44	350.94	140.37	70.84
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	96.67	96.67	4.71	23.94	178.44	374.87	149.95	79.19
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	96.67	96.67	4.71	23.94	178.44	398.81	159.53	87.54
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	96.67	96.67	4.71	23.94	178.44	422.75	169.10	95.90
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	96.67	96.67	4.71	23.94	178.44	446.69	178.68	104.25
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	96.67	96.67	4.71	23.94	178.44	470.63	188.25	112.60
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	96.67	96.67	4.71	23.94	178.44	494.57	197.83	120.95
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	96.67	96.67	1.57	7.98	178.44	502.55	201.02	123.74

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.54E+03	3.56	1.55	1.96	1.82	6.97	6.46	0.194	0.774	10.33	2.58	36.00	16.69	24.79	6.20	86.41	40.05
2	22.50	19	2.96E+07	4.91E-02	2.67E+03	3.53	1.56	1.96	1.81	6.90	6.40	0.188	0.751	10.66	2.66	36.76	17.05	25.58	6.39	88.22	40.91
3	24.00	20	2.96E+07	4.91E-02	2.83E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.181	0.723	11.06	2.76	37.68	17.48	26.54	6.64	90.43	41.96
4	25.50	21	2.96E+07	4.91E-02	2.96E+03	3.45	1.59	1.95	1.81	6.74	6.26	0.175	0.702	11.40	2.85	38.45	17.85	27.37	6.84	92.29	42.84
5	27.00	22	2.96E+07	4.91E-02	3.08E+03	3.43	1.61	1.95	1.81	6.69	6.21	0.171	0.684	11.69	2.92	39.09	18.15	28.05	7.01	93.82	43.57
6	28.50	22	2.96E+07	4.91E-02	3.18E+03	3.40	1.62	1.95	1.81	6.64	6.17	0.168	0.670	11.93	2.98	39.64	18.41	28.64	7.16	95.14	44.19
7	30.00	23	2.96E+07	4.91E-02	3.27E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.659	12.14	3.03	40.09	18.62	29.13	7.28	96.22	44.70

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-96	-
Chainage	10+125	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.75	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-96	1.20	22.00	19.50	16.50	241.27	110.43	13.42	3.35
BH-96	1.20	23.50	21.00	18.00	256.21	123.27	13.84	3.46
BH-96	1.20	25.00	22.50	19.50	271.16	136.11	14.37	3.59
BH-96	1.20	26.50	24.00	21.00	286.11	148.95	14.81	3.70
BH-96	1.20	28.00	25.50	22.50	301.05	161.79	15.18	3.80
BH-96	1.20	29.50	27.00	24.00	316.00	174.62	15.50	3.88
BH-96	1.20	30.00	27.50	24.50	320.98	178.90	15.77	3.94

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	5.88	11.77	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	17.65	23.53	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	29.41	35.30	5.65	6.99	43.46	50.45	20.18	13.04
4	7.00	8.50	1.50	Granular	7.94	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	41.25	47.21	5.65	9.81	56.75	73.54	29.42	18.16
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	53.17	59.13	5.65	13.69	94.97	125.46	50.18	24.37
6	10.00	11.50	1.50	Granular	8.34	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	65.38	71.64	5.65	16.84	114.03	161.36	64.54	31.46
7	11.50	13.00	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	77.90	84.16	5.65	21.60	179.10	248.03	99.21	39.89
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	90.41	96.67	5.65	25.08	204.41	298.42	119.37	49.28
9	14.50	16.00	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	103.94	111.21	5.65	29.86	265.69	389.56	155.82	60.02
10	16.00	17.50	1.50	Granular	9.69	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	118.48	125.75	5.65	34.03	298.91	456.81	182.72	71.92
11	17.50	19.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	125.75	125.75	5.65	37.37	333.16	528.43	211.37	84.76
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	125.75	125.75	5.65	37.37	333.16	565.80	226.32	97.60
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	125.75	125.75	5.65	37.37	333.16	603.16	241.27	110.43
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	125.75	125.75	5.65	37.37	333.16	640.53	256.21	123.27
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	125.75	125.75	5.65	37.37	333.16	677.90	271.16	136.11
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	125.75	125.75	5.65	37.37	333.16	715.27	286.11	148.95
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	125.75	125.75	5.65	37.37	333.16	752.63	301.05	161.79
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	125.75	125.75	5.65	37.37	333.16	790.00	316.00	174.62
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	125.75	125.75	1.88	12.46	333.16	802.46	320.98	178.90

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.54E+03	4.12	1.34	1.98	1.82	8.15	7.50	0.149	0.596	13.42	3.35	54.66	25.17	32.21	8.05	131.18	60.41
2	22.50	19	2.96E+07	1.02E-01	2.67E+03	4.08	1.35	1.98	1.82	8.06	7.43	0.144	0.578	13.84	3.46	55.81	25.71	33.22	8.31	133.94	61.71
3	24.00	20	2.96E+07	1.02E-01	2.83E+03	4.03	1.36	1.98	1.82	7.96	7.34	0.139	0.557	14.37	3.59	57.20	26.37	34.48	8.62	137.29	63.29
4	25.50	21	2.96E+07	1.02E-01	2.96E+03	3.99	1.38	1.97	1.82	7.88	7.27	0.135	0.540	14.81	3.70	58.38	26.92	35.55	8.89	140.11	64.61
5	27.00	22	2.96E+07	1.02E-01	3.08E+03	3.96	1.39	1.97	1.82	7.82	7.21	0.132	0.527	15.18	3.80	59.35	27.38	36.44	9.11	142.44	65.71
6	28.50	22	2.96E+07	1.02E-01	3.18E+03	3.94	1.40	1.97	1.82	7.76	7.17	0.129	0.516	15.50	3.88	60.18	27.77	37.21	9.30	144.44	66.65
7	30.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	1.40	1.97	1.82	7.72	7.13	0.127	0.507	15.77	3.94	60.87	28.09	37.84	9.46	146.08	67.42

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-97	-
Chainage	10+222	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	97.80	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-97	1.00	22.00	19.50	18.00	153.59	81.19	11.53	2.88
BH-97	1.00	23.50	21.00	19.50	162.91	89.62	11.69	2.92
BH-97	1.00	25.00	22.50	21.00	172.60	98.05	11.94	2.98
BH-97	1.00	26.50	24.00	22.50	182.65	106.48	12.14	3.04
BH-97	1.00	28.00	25.50	24.00	192.34	114.91	12.31	3.08
BH-97	1.00	29.50	27.00	25.50	202.03	123.34	12.46	3.11
BH-97	1.00	30.00	27.50	26.00	205.26	126.15	12.57	3.14

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.34	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	5.51	11.02	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.34	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	16.52	22.03	4.71	2.86	11.85	14.71	5.88	6.85
3	5.50	7.00	1.50	Granular	8.49	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	28.40	34.77	4.71	5.86	33.17	41.89	16.76	10.14
4	7.00	8.50	1.50	Granular	8.49	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	41.14	47.51	4.71	8.49	44.09	61.31	24.52	14.17
5	8.50	10.00	1.50	Granular	8.49	0.08	26	-	11.90	13.19	1.00	-	9.25	10.00	53.88	60.25	4.71	11.56	66.63	95.41	38.16	19.05
6	10.00	11.50	1.50	Granular	8.34	0.08	26	-	11.90	13.19	1.00	-	10.75	11.50	66.51	72.77	4.71	14.27	79.58	122.63	49.05	24.70
7	11.50	13.00	1.50	Granular	8.34	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	79.02	85.28	4.71	18.26	124.92	186.24	74.49	31.46
8	13.00	14.50	1.50	Granular	8.34	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	91.54	97.80	4.71	21.16	142.50	224.97	89.99	39.04
9	14.50	16.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	15.25	16.00	97.80	97.80	4.71	24.22	180.43	287.11	114.85	47.47
10	16.00	17.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	16.75	17.50	97.80	97.80	4.71	24.22	180.43	311.33	124.53	55.90
11	17.50	19.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	97.80	97.80	4.71	24.22	180.43	335.55	134.22	64.33
12	19.00	20.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	97.80	97.80	4.71	24.22	180.43	359.77	143.91	72.76
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	97.80	97.80	4.71	24.22	180.43	383.98	153.59	81.19
14	22.00	23.50	1.50	Granular	8.49	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	97.80	97.80	4.71	24.22	179.51	407.28	162.91	89.62
15	23.50	25.00	1.50	Granular	8.49	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	97.80	97.80	4.71	24.22	179.51	431.49	172.60	98.05
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	97.80	97.80	4.71	24.22	180.43	456.63	182.65	106.48
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	97.80	97.80	4.71	24.22	180.43	480.85	192.34	114.91
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	97.80	97.80	4.71	24.22	180.43	505.07	202.03	123.34
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	97.80	97.80	1.57	8.07	180.43	513.14	205.26	126.15

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	4.91E-02	3.34E+03	3.37	1.19	1.99	1.83	6.72	6.16	0.173	0.694	11.53	2.88	38.75	17.75	27.68	6.92	93.00	42.61
2	22.50	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.684	11.69	2.92	39.10	17.92	28.06	7.01	93.84	43.00
3	24.00	25	2.96E+07	4.91E-02	3.52E+03	3.33	1.20	1.99	1.83	6.64	6.09	0.168	0.670	11.94	2.98	39.64	18.17	28.65	7.16	95.15	43.61
4	25.50	25	2.96E+07	4.91E-02	3.62E+03	3.32	1.21	1.99	1.83	6.60	6.06	0.165	0.659	12.14	3.04	40.10	18.39	29.14	7.29	96.25	44.12
5	27.00	26	2.96E+07	4.91E-02	3.70E+03	3.30	1.21	1.99	1.83	6.57	6.03	0.162	0.650	12.31	3.08	40.47	18.56	29.55	7.39	97.14	44.54
6	28.50	26	2.96E+07	4.91E-02	3.77E+03	3.29	1.22	1.99	1.83	6.55	6.01	0.161	0.642	12.46	3.11	40.79	18.71	29.90	7.47	97.90	44.90
7	30.00	27	2.96E+07	4.91E-02	3.82E+03	3.28	1.22	1.99	1.83	6.53	5.99	0.159	0.636	12.57	3.14	41.04	18.82	30.17	7.54	98.50	45.18

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-97	-
Chainage	10+222	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	126.88	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-97	1.20	22.00	19.50	18.00	245.94	112.91	15.01	3.75
BH-97	1.20	23.50	21.00	19.50	260.39	125.84	15.21	3.80
BH-97	1.20	25.00	22.50	21.00	275.47	138.77	15.53	3.88
BH-97	1.20	26.50	24.00	22.50	291.19	151.70	15.80	3.95
BH-97	1.20	28.00	25.50	24.00	306.27	164.63	16.02	4.00
BH-97	1.20	29.50	27.00	25.50	321.35	177.56	16.20	4.05
BH-97	1.20	30.00	27.50	26.00	326.37	181.87	16.35	4.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.34	0.08	21	-	2.00	6.49	1.00	-	3.25	4.00	5.51	11.02	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.34	0.08	21	-	2.00	6.49	1.00	-	4.75	5.50	16.52	22.03	5.65	3.44	17.22	20.66	8.26	9.67
3	5.50	7.00	1.50	Granular	8.49	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	28.40	34.77	5.65	7.03	48.72	59.19	23.68	14.01
4	7.00	8.50	1.50	Granular	8.49	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	41.14	47.51	5.65	10.19	64.46	85.11	34.05	19.24
5	8.50	10.00	1.50	Granular	8.49	0.08	26	-	11.90	13.19	1.00	-	9.25	10.00	53.88	60.25	5.65	13.88	97.10	131.63	52.65	25.50
6	10.00	11.50	1.50	Granular	8.34	0.08	26	-	11.90	13.19	1.00	-	10.75	11.50	66.51	72.77	5.65	17.13	115.72	167.38	66.95	32.67
7	11.50	13.00	1.50	Granular	8.34	0.05	28	-	15.70	17.82	1.00	-	12.25	13.00	79.02	85.28	5.65	21.92	181.37	254.95	101.98	41.19
8	13.00	14.50	1.50	Granular	8.34	0.05	28	-	15.70	17.82	1.00	-	13.75	14.50	91.54	97.80	5.65	25.39	206.68	305.65	122.26	50.67
9	14.50	16.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	15.25	16.00	105.07	112.34	5.65	31.22	299.00	429.18	171.67	61.79
10	16.00	17.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	16.75	17.50	119.61	126.88	5.65	35.54	336.03	501.76	200.70	74.11
11	17.50	19.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	18.25	19.00	126.88	126.88	5.65	37.70	336.03	539.46	215.78	87.04
12	19.00	20.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	19.75	20.50	126.88	126.88	5.65	37.70	336.03	577.16	230.86	99.98
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	126.88	126.88	5.65	37.70	336.03	614.86	245.94	112.91
14	22.00	23.50	1.50	Granular	8.49	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	126.88	126.88	5.65	37.70	334.44	650.97	260.39	125.84
15	23.50	25.00	1.50	Granular	8.49	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	126.88	126.88	5.65	37.70	334.44	688.67	275.47	138.77
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	126.88	126.88	5.65	37.70	336.03	727.96	291.19	151.70
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	126.88	126.88	5.65	37.70	336.03	765.67	306.27	164.63
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	126.88	126.88	5.65	37.70	336.03	803.37	321.35	177.56
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	126.88	126.88	1.88	12.57	336.03	815.93	326.37	181.87

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	23	2.96E+07	1.02E-01	3.34E+03	3.90	1.03	2.01	1.83	7.85	7.15	0.133	0.533	15.01	3.75	58.89	26.81	36.02	9.00	141.35	64.35
2	22.50	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.81	7.12	0.131	0.526	15.21	3.80	59.42	27.06	36.51	9.13	142.62	64.94
3	24.00	25	2.96E+07	1.02E-01	3.52E+03	3.86	1.04	2.01	1.83	7.76	7.07	0.129	0.515	15.53	3.88	60.25	27.44	37.27	9.32	144.59	65.86
4	25.50	25	2.96E+07	1.02E-01	3.62E+03	3.84	1.04	2.01	1.83	7.72	7.03	0.127	0.506	15.80	3.95	60.94	27.76	37.91	9.48	146.26	66.63
5	27.00	26	2.96E+07	1.02E-01	3.70E+03	3.82	1.05	2.01	1.83	7.68	7.00	0.125	0.499	16.02	4.00	61.51	28.03	38.44	9.61	147.61	67.26
6	28.50	26	2.96E+07	1.02E-01	3.77E+03	3.81	1.05	2.01	1.83	7.65	6.97	0.123	0.494	16.20	4.05	61.98	28.25	38.89	9.72	148.76	67.80
7	30.00	27	2.96E+07	1.02E-01	3.82E+03	3.80	1.05	2.01	1.83	7.63	6.95	0.122	0.489	16.35	4.09	62.36	28.42	39.25	9.81	149.67	68.22

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-98	-
Chainage	10+328	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	86.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-98	1.00	22.00	19.50	15.00	122.14	64.89	9.89	2.47
BH-98	1.00	23.50	21.00	16.50	130.68	72.52	10.47	2.62
BH-98	1.00	25.00	22.50	18.00	139.23	80.15	10.61	2.65
BH-98	1.00	26.50	24.00	19.50	147.77	87.78	11.04	2.76
BH-98	1.00	28.00	25.50	21.00	156.31	95.41	11.39	2.85
BH-98	1.00	29.50	27.00	22.50	164.85	103.03	11.70	2.93
BH-98	1.00	30.00	27.50	23.00	167.70	105.58	11.96	2.99

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.79	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.10	10.19	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.79	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	15.29	20.38	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	6.29	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	25.10	29.82	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	6.29	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	34.54	39.26	4.71	7.13	36.15	43.28	17.31	11.34
5	8.50	10.00	1.50	Granular	6.29	0.08	21	-	2.00	6.49	1.00	-	9.25	10.00	43.98	48.70	4.71	0.00	25.40	32.53	13.01	12.99
6	10.00	11.50	1.50	Granular	8.34	0.08	21	-	2.00	6.49	1.00	-	10.75	11.50	54.96	61.22	4.71	0.00	31.96	39.09	15.64	14.64
7	11.50	13.00	1.50	Granular	8.34	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	67.47	73.73	4.71	15.04	94.64	116.81	46.72	20.50
8	13.00	14.50	1.50	Granular	8.34	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	79.99	86.25	4.71	17.83	109.93	149.93	59.97	27.14
9	14.50	16.00	1.50	Granular	8.34	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	86.25	86.25	4.71	20.64	142.62	203.26	81.30	34.57
10	16.00	17.50	1.50	Granular	8.34	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	86.25	86.25	4.71	20.64	142.62	223.90	89.56	42.00
11	17.50	19.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	18.25	19.00	86.25	86.25	4.71	21.36	160.00	262.64	105.05	49.63
12	19.00	20.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	19.75	20.50	86.25	86.25	4.71	21.36	160.00	283.99	113.60	57.26
13	20.50	22.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	21.25	22.00	86.25	86.25	4.71	21.36	160.00	305.35	122.14	64.89
14	22.00	23.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	22.75	23.50	86.25	86.25	4.71	21.36	160.00	326.71	130.68	72.52
15	23.50	25.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	24.25	25.00	86.25	86.25	4.71	21.36	160.00	348.06	139.23	80.15
16	25.00	26.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	25.75	26.50	86.25	86.25	4.71	21.36	160.00	369.42	147.77	87.78
17	26.50	28.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	27.25	28.00	86.25	86.25	4.71	21.36	160.00	390.78	156.31	95.41
18	28.00	29.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	28.75	29.50	86.25	86.25	4.71	21.36	160.00	412.13	164.85	103.03
19	29.50	30.00	0.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	29.75	30.00	86.25	86.25	1.57	7.12	160.00	419.25	167.70	105.58

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.20E+03	3.66	1.91	1.93	1.81	7.07	6.62	0.202	0.809	9.89	2.47	34.97	16.36	23.73	5.93	83.93	39.26
2	22.50	17	2.96E+07	4.91E-02	2.40E+03	3.60	1.94	1.93	1.81	6.94	6.50	0.191	0.764	10.47	2.62	36.32	17.00	25.12	6.28	87.17	40.81
3	24.00	17	2.96E+07	4.91E-02	2.46E+03	3.58	1.95	1.93	1.81	6.91	6.47	0.189	0.754	10.61	2.65	36.65	17.16	25.46	6.37	87.96	41.18
4	25.50	18	2.96E+07	4.91E-02	2.61E+03	3.54	1.98	1.93	1.80	6.82	6.39	0.181	0.725	11.04	2.76	37.63	17.63	26.49	6.62	90.31	42.30
5	27.00	19	2.96E+07	4.91E-02	2.75E+03	3.50	2.00	1.92	1.80	6.75	6.32	0.176	0.702	11.39	2.85	38.43	18.01	27.35	6.84	92.24	43.23
6	28.50	20	2.96E+07	4.91E-02	2.86E+03	3.48	2.01	1.92	1.80	6.69	6.27	0.171	0.684	11.70	2.93	39.12	18.34	28.08	7.02	93.89	44.02
7	30.00	21	2.96E+07	4.91E-02	2.96E+03	3.45	2.03	1.92	1.80	6.64	6.23	0.167	0.669	11.96	2.99	39.69	18.61	28.70	7.17	95.26	44.67

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-98	-
Chainage	10+328	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	111.28	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	7.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-98	1.20	22.00	19.50	15.00	200.09	91.93	12.86	3.21
BH-98	1.20	23.50	21.00	16.50	213.31	103.57	13.61	3.40
BH-98	1.20	25.00	22.50	18.00	226.54	115.20	13.80	3.45
BH-98	1.20	26.50	24.00	19.50	239.77	126.83	14.36	3.59
BH-98	1.20	28.00	25.50	21.00	252.99	138.47	14.82	3.71
BH-98	1.20	29.50	27.00	22.50	266.22	150.10	15.22	3.81
BH-98	1.20	30.00	27.50	23.00	270.63	153.98	15.56	3.89

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.79	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.10	10.19	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.79	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	15.29	20.38	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	6.29	0.02	25	-	10.00	10.88	1.00	-	6.25	7.00	25.10	29.82	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	6.29	0.02	25	-	10.00	10.88	1.00	-	7.75	8.50	34.54	39.26	5.65	8.55	52.77	61.32	24.53	15.85
5	8.50	10.00	1.50	Granular	6.29	0.08	21	-	2.00	6.49	1.00	-	9.25	10.00	43.98	48.70	5.65	0.00	36.72	45.27	18.11	18.23
6	10.00	11.50	1.50	Granular	8.34	0.08	21	-	2.00	6.49	1.00	-	10.75	11.50	54.96	61.22	5.65	0.00	46.22	54.77	21.91	20.60
7	11.50	13.00	1.50	Granular	8.34	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	67.47	73.73	5.65	18.04	137.59	164.19	65.68	28.03
8	13.00	14.50	1.50	Granular	8.34	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	79.99	86.25	5.65	21.39	159.61	207.60	83.04	36.40
9	14.50	16.00	1.50	Granular	8.34	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	92.50	98.76	5.65	26.57	235.63	310.19	124.08	46.21
10	16.00	17.50	1.50	Granular	8.34	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	105.02	111.28	5.65	30.17	264.22	368.95	147.58	57.03
11	17.50	19.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	18.25	19.00	111.28	111.28	5.65	33.07	296.30	434.09	173.64	68.67
12	19.00	20.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	19.75	20.50	111.28	111.28	5.65	33.07	296.30	467.15	186.86	80.30
13	20.50	22.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	21.25	22.00	111.28	111.28	5.65	33.07	296.30	500.22	200.09	91.93
14	22.00	23.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	22.75	23.50	111.28	111.28	5.65	33.07	296.30	533.29	213.31	103.57
15	23.50	25.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	24.25	25.00	111.28	111.28	5.65	33.07	296.30	566.35	226.54	115.20
16	25.00	26.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	25.75	26.50	111.28	111.28	5.65	33.07	296.30	599.42	239.77	126.83
17	26.50	28.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	27.25	28.00	111.28	111.28	5.65	33.07	296.30	632.48	252.99	138.47
18	28.00	29.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	28.75	29.50	111.28	111.28	5.65	33.07	296.30	665.55	266.22	150.10
19	29.50	30.00	0.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	29.75	30.00	111.28	111.28	1.88	11.02	296.30	676.57	270.63	153.98

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.20E+03	4.24	1.65	1.95	1.81	8.26	7.68	0.156	0.622	12.86	3.21	53.12	24.70	30.86	7.71	127.49	59.27
2	22.50	17	2.96E+07	1.02E-01	2.40E+03	4.16	1.68	1.95	1.81	8.11	7.54	0.147	0.588	13.61	3.40	55.18	25.67	32.67	8.17	132.43	61.61
3	24.00	17	2.96E+07	1.02E-01	2.46E+03	4.15	1.69	1.95	1.81	8.07	7.51	0.145	0.580	13.80	3.45	55.68	25.91	33.11	8.28	133.63	62.19
4	25.50	18	2.96E+07	1.02E-01	2.61E+03	4.10	1.71	1.94	1.81	7.97	7.42	0.139	0.557	14.36	3.59	57.17	26.62	34.45	8.61	137.22	63.89
5	27.00	19	2.96E+07	1.02E-01	2.75E+03	4.06	1.73	1.94	1.81	7.88	7.34	0.135	0.540	14.82	3.71	58.41	27.21	35.57	8.89	140.17	65.29
6	28.50	20	2.96E+07	1.02E-01	2.86E+03	4.02	1.74	1.94	1.81	7.81	7.28	0.131	0.526	15.22	3.81	59.46	27.70	36.54	9.13	142.69	66.49
7	30.00	21	2.96E+07	1.02E-01	2.96E+03	3.99	1.75	1.94	1.81	7.75	7.23	0.129	0.514	15.56	3.89	60.32	28.12	37.34	9.33	144.78	67.48

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-99	-
Chainage	10+428	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.62	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-99	1.00	22.00	19.50	19.50	155.25	81.94	10.60	2.65
BH-99	1.00	23.50	21.00	21.00	165.02	90.42	10.86	2.71
BH-99	1.00	25.00	22.50	22.50	174.79	98.91	11.07	2.77
BH-99	1.00	26.50	24.00	24.00	184.56	107.40	11.25	2.81
BH-99	1.00	28.00	25.50	25.50	194.32	115.89	11.40	2.85
BH-99	1.00	29.50	27.00	27.00	204.09	124.37	11.53	2.88
BH-99	1.00	30.00	27.50	27.50	207.35	127.20	11.63	2.91

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	5.88	11.77	4.71	1.17	11.54	12.71	5.08	4.72
2	4.00	5.50	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	17.65	23.53	4.71	3.50	20.62	25.28	10.11	7.35
3	5.50	7.00	1.50	Granular	8.34	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	29.79	36.05	4.71	5.90	30.42	40.99	16.39	10.65
4	7.00	8.50	1.50	Granular	8.34	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	42.30	48.56	4.71	8.38	40.07	59.02	23.61	14.65
5	8.50	10.00	1.50	Granular	8.34	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	54.82	61.08	4.71	12.22	79.18	110.34	44.13	19.72
6	10.00	11.50	1.50	Granular	8.34	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	67.33	73.59	4.71	15.01	94.47	140.64	56.25	25.57
7	11.50	13.00	1.50	Granular	8.34	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	79.85	86.11	4.71	19.11	142.40	207.68	83.07	32.57
8	13.00	14.50	1.50	Granular	8.34	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	92.36	98.62	4.71	22.11	162.25	249.64	99.86	40.41
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	98.62	98.62	4.71	23.61	163.19	274.18	109.67	48.67
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	98.62	98.62	4.71	23.61	163.19	297.79	119.12	56.93
11	17.50	19.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	98.62	98.62	4.71	23.61	163.19	321.40	128.56	65.19
12	19.00	20.50	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	98.62	98.62	4.71	23.61	163.19	345.01	138.00	73.45
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	98.62	98.62	4.71	24.42	181.89	388.12	155.25	81.94
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	98.62	98.62	4.71	24.42	181.89	412.55	165.02	90.42
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	98.62	98.62	4.71	24.42	181.89	436.97	174.79	98.91
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	98.62	98.62	4.71	24.42	181.89	461.39	184.56	107.40
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	98.62	98.62	4.71	24.42	181.89	485.81	194.32	115.89
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	98.62	98.62	4.71	24.42	181.89	510.23	204.09	124.37
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	98.62	98.62	1.57	8.14	181.89	518.37	207.35	127.20

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.34E+03	3.37	0.74	2.05	1.84	6.91	6.21	0.189	0.755	10.60	2.65	36.62	16.47	25.43	6.36	87.89	39.52
2	22.50	24	2.96E+07	4.91E-02	3.48E+03	3.34	0.75	2.05	1.84	6.86	6.17	0.184	0.737	10.86	2.71	37.22	16.74	26.06	6.52	89.34	40.18
3	24.00	25	2.96E+07	4.91E-02	3.59E+03	3.32	0.75	2.05	1.84	6.81	6.13	0.181	0.722	11.07	2.77	37.71	16.96	26.58	6.64	90.51	40.71
4	25.50	26	2.96E+07	4.91E-02	3.68E+03	3.31	0.76	2.05	1.84	6.77	6.10	0.178	0.711	11.25	2.81	38.12	17.15	27.01	6.75	91.49	41.16
5	27.00	26	2.96E+07	4.91E-02	3.76E+03	3.29	0.76	2.05	1.84	6.74	6.07	0.175	0.702	11.40	2.85	38.45	17.30	27.37	6.84	92.29	41.53
6	28.50	27	2.96E+07	4.91E-02	3.82E+03	3.28	0.76	2.05	1.84	6.72	6.05	0.173	0.694	11.53	2.88	38.74	17.43	27.67	6.92	92.97	41.84
7	30.00	27	2.96E+07	4.91E-02	3.87E+03	3.27	0.76	2.05	1.84	6.70	6.03	0.172	0.688	11.63	2.91	38.96	17.53	27.91	6.98	93.50	42.08

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-99	-
Chainage	10+428	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	127.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-99	1.20	22.00	19.50	19.50	247.73	113.57	13.87	3.47
BH-99	1.20	23.50	21.00	21.00	262.91	126.57	14.21	3.55
BH-99	1.20	25.00	22.50	22.50	278.08	139.57	14.49	3.62
BH-99	1.20	26.50	24.00	24.00	293.26	152.57	14.73	3.68
BH-99	1.20	28.00	25.50	25.50	308.44	165.57	14.92	3.73
BH-99	1.20	29.50	27.00	27.00	323.62	178.57	15.08	3.77
BH-99	1.20	30.00	27.50	27.50	328.68	182.90	15.21	3.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	3.25	4.00	5.88	11.77	5.65	1.40	17.34	18.73	7.49	6.73
2	4.00	5.50	1.50	Granular	7.84	0.05	24	-	8.00	9.78	1.00	-	4.75	5.50	17.65	23.53	5.65	4.20	30.40	35.99	14.40	10.27
3	5.50	7.00	1.50	Granular	8.34	0.05	24	-	8.00	9.78	1.00	-	6.25	7.00	29.79	36.05	5.65	7.08	44.57	57.24	22.90	14.63
4	7.00	8.50	1.50	Granular	8.34	0.05	24	-	8.00	9.78	1.00	-	7.75	8.50	42.30	48.56	5.65	10.06	58.46	81.19	32.48	19.82
5	8.50	10.00	1.50	Granular	8.34	0.03	27	-	13.80	15.50	1.00	-	9.25	10.00	54.82	61.08	5.65	14.66	115.32	152.71	61.08	26.30
6	10.00	11.50	1.50	Granular	8.34	0.03	27	-	13.80	15.50	1.00	-	10.75	11.50	67.33	73.59	5.65	18.01	137.34	192.74	77.10	33.72
7	11.50	13.00	1.50	Granular	8.34	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	79.85	86.11	5.65	22.94	206.72	285.05	114.02	42.52
8	13.00	14.50	1.50	Granular	8.34	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	92.36	98.62	5.65	26.53	235.31	340.18	136.07	52.32
9	14.50	16.00	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	105.89	113.16	5.65	30.42	270.15	405.43	162.17	63.21
10	16.00	17.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	120.43	127.70	5.65	34.59	303.36	473.24	189.30	75.27
11	17.50	19.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	18.25	19.00	127.70	127.70	5.65	36.68	303.36	509.92	203.97	87.92
12	19.00	20.50	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	19.75	20.50	127.70	127.70	5.65	36.68	303.36	546.60	218.64	100.57
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	127.70	127.70	5.65	37.95	338.13	619.32	247.73	113.57
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	127.70	127.70	5.65	37.95	338.13	657.26	262.91	126.57
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	127.70	127.70	5.65	37.95	338.13	695.21	278.08	139.57
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	127.70	127.70	5.65	37.95	338.13	733.16	293.26	152.57
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	127.70	127.70	5.65	37.95	338.13	771.10	308.44	165.57
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	127.70	127.70	5.65	37.95	338.13	809.05	323.62	178.57
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	127.70	127.70	1.88	12.65	338.13	821.70	328.68	182.90

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.34E+03	3.90	0.64	2.07	1.85	8.06	7.21	0.144	0.577	13.87	3.47	55.88	25.00	33.29	8.32	134.12	60.00
2	22.50	24	2.96E+07	1.02E-01	3.48E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.563	14.21	3.55	56.80	25.42	34.11	8.53	136.31	61.00
3	24.00	25	2.96E+07	1.02E-01	3.59E+03	3.84	0.65	2.07	1.85	7.94	7.11	0.138	0.552	14.49	3.62	57.54	25.75	34.78	8.70	138.09	61.81
4	25.50	26	2.96E+07	1.02E-01	3.68E+03	3.82	0.65	2.06	1.85	7.90	7.07	0.136	0.543	14.73	3.68	58.16	26.04	35.35	8.84	139.58	62.49
5	27.00	26	2.96E+07	1.02E-01	3.76E+03	3.81	0.66	2.06	1.85	7.86	7.04	0.134	0.536	14.92	3.73	58.67	26.27	35.81	8.95	140.80	63.04
6	28.50	27	2.96E+07	1.02E-01	3.82E+03	3.80	0.66	2.06	1.85	7.84	7.02	0.133	0.530	15.08	3.77	59.09	26.46	36.20	9.05	141.82	63.51
7	30.00	27	2.96E+07	1.02E-01	3.87E+03	3.79	0.66	2.06	1.85	7.81	7.00	0.131	0.526	15.21	3.80	59.43	26.61	36.51	9.13	142.63	63.87

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-100	-
Chainage	10+542	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	92.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-100	1.00	22.00	19.50	16.50	134.68	75.61	9.78	2.44
BH-100	1.00	23.50	21.00	18.00	143.51	83.44	9.95	2.49
BH-100	1.00	25.00	22.50	19.50	159.67	91.48	10.40	2.60
BH-100	1.00	26.50	24.00	21.00	168.80	99.53	10.78	2.69
BH-100	1.00	28.00	25.50	22.50	177.94	107.57	11.09	2.77
BH-100	1.00	29.50	27.00	24.00	187.08	115.62	11.37	2.84
BH-100	1.00	30.00	27.50	24.50	190.12	118.30	11.59	2.90

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.79	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.10	10.19	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.34	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	15.70	21.21	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.34	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	26.71	32.22	4.71	5.73	36.95	42.68	17.07	9.30
4	7.00	8.50	1.50	Granular	7.34	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	37.73	43.24	4.71	8.10	48.40	62.23	24.89	13.22
5	8.50	10.00	1.50	Granular	7.34	0.07	25	-	10.00	10.88	1.00	-	9.25	10.00	48.74	54.25	4.71	10.06	49.42	73.31	29.32	17.68
6	10.00	11.50	1.50	Granular	8.49	0.07	25	-	10.00	10.88	1.00	-	10.75	11.50	60.62	66.99	4.71	12.51	60.80	97.19	38.88	22.84
7	11.50	13.00	1.50	Granular	8.49	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	73.36	79.73	4.71	16.95	117.22	170.57	68.23	29.23
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	85.99	92.25	4.71	19.87	134.70	207.93	83.17	36.45
9	14.50	16.00	1.50	Granular	8.34	0.02	30	-	19.50	22.44	1.00	-	15.25	16.00	92.25	92.25	4.71	22.84	169.57	265.64	106.26	44.49
10	16.00	17.50	1.50	Granular	8.34	0.02	30	-	19.50	22.44	1.00	-	16.75	17.50	92.25	92.25	4.71	22.84	169.57	288.48	115.39	52.54
11	17.50	19.00	1.50	Granular	9.69	0.11	28	-	15.70	17.82	1.00	-	18.25	19.00	92.25	92.25	4.71	21.32	135.54	275.77	110.31	60.16
12	19.00	20.50	1.50	Granular	9.69	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	92.25	92.25	4.71	21.32	135.54	297.09	118.84	67.77
13	20.50	22.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	21.25	22.00	92.25	92.25	4.71	22.08	153.07	336.71	134.68	75.61
14	22.00	23.50	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	22.75	23.50	92.25	92.25	4.71	22.08	153.07	358.79	143.51	83.44
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	92.25	92.25	4.71	22.84	170.61	399.17	159.67	91.48
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	92.25	92.25	4.71	22.84	170.61	422.01	168.80	99.53
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	92.25	92.25	4.71	22.84	170.61	444.85	177.94	107.57
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	92.25	92.25	4.71	22.84	170.61	467.69	187.08	115.62
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	92.25	92.25	1.57	7.61	170.61	475.31	190.12	118.30

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.33E+03	3.62	1.52	1.96	1.82	7.10	6.58	0.205	0.818	9.78	2.44	34.70	16.07	23.46	5.87	83.29	38.58
2	22.50	17	2.96E+07	4.91E-02	2.40E+03	3.60	1.53	1.96	1.82	7.06	6.54	0.201	0.804	9.95	2.49	35.11	16.27	23.88	5.97	84.27	39.04
3	24.00	18	2.96E+07	4.91E-02	2.57E+03	3.55	1.55	1.96	1.82	6.96	6.45	0.192	0.769	10.40	2.60	36.16	16.76	24.95	6.24	86.78	40.23
4	25.50	19	2.96E+07	4.91E-02	2.71E+03	3.51	1.57	1.96	1.81	6.87	6.38	0.186	0.742	10.78	2.69	37.03	17.18	25.86	6.47	88.88	41.22
5	27.00	20	2.96E+07	4.91E-02	2.84E+03	3.48	1.58	1.96	1.81	6.81	6.32	0.180	0.721	11.09	2.77	37.76	17.52	26.63	6.66	90.62	42.05
6	28.50	21	2.96E+07	4.91E-02	2.95E+03	3.46	1.59	1.95	1.81	6.75	6.27	0.176	0.704	11.37	2.84	38.37	17.81	27.28	6.82	92.09	42.75
7	30.00	21	2.96E+07	4.91E-02	3.04E+03	3.43	1.60	1.95	1.81	6.71	6.23	0.173	0.690	11.59	2.90	38.88	18.05	27.82	6.95	93.30	43.32

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-100	-
Chainage	10+542	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	117.28	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-100	1.20	22.00	19.50	16.50	211.37	104.52	12.70	3.18
BH-100	1.20	23.50	21.00	18.00	224.84	116.32	12.92	3.23
BH-100	1.20	25.00	22.50	19.50	251.59	128.46	13.51	3.38
BH-100	1.20	26.50	24.00	21.00	265.53	140.59	14.00	3.50
BH-100	1.20	28.00	25.50	22.50	279.47	152.72	14.41	3.60
BH-100	1.20	29.50	27.00	24.00	293.41	164.86	14.77	3.69
BH-100	1.20	30.00	27.50	24.50	298.06	168.90	15.06	3.76

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.79	0.02	23	-	6.00	8.68	1.00	-	3.25	4.00	5.10	10.19	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.34	0.02	23	-	6.00	8.68	1.00	-	4.75	5.50	15.70	21.21	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.34	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	26.71	32.22	5.65	6.88	54.20	61.08	24.43	13.01
4	7.00	8.50	1.50	Granular	7.34	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	37.73	43.24	5.65	9.72	70.69	87.28	34.91	18.11
5	8.50	10.00	1.50	Granular	7.34	0.07	25	-	10.00	10.88	1.00	-	9.25	10.00	48.74	54.25	5.65	12.07	72.00	100.66	40.26	23.86
6	10.00	11.50	1.50	Granular	8.49	0.07	25	-	10.00	10.88	1.00	-	10.75	11.50	60.62	66.99	5.65	15.01	88.51	132.19	52.88	30.44
7	11.50	13.00	1.50	Granular	8.49	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	73.36	79.73	5.65	20.35	170.31	234.33	93.73	38.51
8	13.00	14.50	1.50	Granular	8.34	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	85.99	92.25	5.65	23.85	195.46	283.33	113.33	47.56
9	14.50	16.00	1.50	Granular	8.34	0.02	30	-	19.50	22.44	1.00	-	15.25	16.00	98.50	104.76	5.65	29.27	277.91	395.05	158.02	58.13
10	16.00	17.50	1.50	Granular	8.34	0.02	30	-	19.50	22.44	1.00	-	16.75	17.50	111.02	117.28	5.65	32.99	309.78	459.92	183.97	69.75
11	17.50	19.00	1.50	Granular	9.69	0.11	28	-	15.70	17.82	1.00	-	18.25	19.00	117.28	117.28	5.65	32.53	247.52	430.17	172.07	81.23
12	19.00	20.50	1.50	Granular	9.69	0.11	28	-	15.70	17.82	1.00	-	19.75	20.50	117.28	117.28	5.65	32.53	247.52	462.70	185.08	92.71
13	20.50	22.00	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	21.25	22.00	117.28	117.28	5.65	33.69	279.55	528.42	211.37	104.52
14	22.00	23.50	1.50	Granular	9.69	0.07	29	-	17.60	20.13	1.00	-	22.75	23.50	117.28	117.28	5.65	33.69	279.55	562.10	224.84	116.32
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	117.28	117.28	5.65	34.85	311.58	628.98	251.59	128.46
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	117.28	117.28	5.65	34.85	311.58	663.83	265.53	140.59
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	117.28	117.28	5.65	34.85	311.58	698.68	279.47	152.72
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	117.28	117.28	5.65	34.85	311.58	733.53	293.41	164.86
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	117.28	117.28	1.88	11.62	311.58	745.15	298.06	168.90

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.33E+03	4.19	1.31	1.98	1.82	8.30	7.64	0.157	0.630	12.70	3.18	52.69	24.25	30.48	7.62	126.46	58.19
2	22.50	17	2.96E+07	1.02E-01	2.40E+03	4.17	1.32	1.98	1.82	8.25	7.59	0.155	0.619	12.92	3.23	53.31	24.54	31.02	7.75	127.94	58.89
3	24.00	18	2.96E+07	1.02E-01	2.57E+03	4.11	1.34	1.98	1.82	8.13	7.49	0.148	0.592	13.51	3.38	54.90	25.28	32.41	8.10	131.75	60.68
4	25.50	19	2.96E+07	1.02E-01	2.71E+03	4.06	1.35	1.98	1.82	8.03	7.40	0.143	0.571	14.00	3.50	56.23	25.91	33.60	8.40	134.94	62.18
5	27.00	20	2.96E+07	1.02E-01	2.84E+03	4.03	1.37	1.97	1.82	7.96	7.33	0.139	0.555	14.41	3.60	57.32	26.42	34.59	8.65	137.58	63.42
6	28.50	21	2.96E+07	1.02E-01	2.95E+03	4.00	1.38	1.97	1.82	7.89	7.28	0.135	0.542	14.77	3.69	58.26	26.86	35.44	8.86	139.82	64.48
7	30.00	21	2.96E+07	1.02E-01	3.04E+03	3.97	1.38	1.97	1.82	7.84	7.23	0.133	0.531	15.06	3.76	59.02	27.23	36.14	9.03	141.66	65.34

A.12. Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-101	1.00	22.00	19.50	18.00	324.35	147.97	11.08	2.77	159.10	83.29	11.08	2.77
BH-101	1.00	23.50	21.00	19.50	344.59	163.79	11.41	2.85	169.13	91.97	11.41	2.85
BH-101	1.00	25.00	22.50	21.00	364.82	179.60	11.68	2.92	179.17	100.64	11.68	2.92
BH-101	1.00	26.50	24.00	22.50	385.06	195.42	11.91	2.98	189.21	109.32	11.91	2.98
BH-101	1.00	28.00	25.50	24.00	405.29	211.23	12.09	3.02	199.24	117.99	12.09	3.02
BH-101	1.00	29.50	27.00	25.50	425.53	227.04	12.25	3.06	209.28	126.67	12.25	3.06
BH-101	1.00	30.00	27.50	26.00	432.27	232.31	12.38	3.10	212.62	129.56	12.38	3.10
BH-101	1.20	22.00	19.50	18.00	468.82	192.97	14.42	3.61	253.03	115.35	14.42	3.61
BH-101	1.20	23.50	21.00	19.50	496.56	214.76	14.85	3.71	268.53	128.58	14.85	3.71
BH-101	1.20	25.00	22.50	21.00	524.30	236.56	15.19	3.80	284.03	141.80	15.19	3.80
BH-101	1.20	26.50	24.00	22.50	552.04	258.35	15.49	3.87	299.53	155.03	15.49	3.87
BH-101	1.20	28.00	25.50	24.00	579.78	280.14	15.73	3.93	315.03	168.25	15.73	3.93
BH-101	1.20	29.50	27.00	25.50	607.52	301.93	15.94	3.98	330.53	181.48	15.94	3.98
BH-101	1.20	30.00	27.50	26.00	616.76	309.20	16.11	4.03	335.70	185.89	16.11	4.03
BH-102	1.00	22.00	19.50	13.50	271.85	121.66	10.66	2.66	139.08	72.44	10.66	2.66
BH-102	1.00	23.50	21.00	15.00	289.99	136.02	11.22	2.80	148.48	80.67	11.22	2.80
BH-102	1.00	25.00	22.50	16.50	308.14	150.37	11.68	2.92	157.89	88.90	11.68	2.92
BH-102	1.00	26.50	24.00	18.00	326.29	164.72	12.07	3.02	167.29	97.13	12.07	3.02
BH-102	1.00	28.00	25.50	19.50	344.07	179.07	12.39	3.10	176.33	105.37	12.39	3.10

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-102	1.00	29.50	27.00	21.00	362.21	193.42	12.67	3.17	185.73	113.60	12.67	3.17
BH-102	1.00	30.00	27.50	21.50	368.26	198.21	12.90	3.23	188.86	116.34	12.90	3.23
BH-102	1.20	22.00	19.50	13.50	396.57	160.00	13.90	3.48	222.26	100.93	13.90	3.48
BH-102	1.20	23.50	21.00	15.00	421.37	179.74	14.64	3.66	236.57	113.32	14.64	3.66
BH-102	1.20	25.00	22.50	16.50	446.18	199.48	15.25	3.81	250.88	125.72	15.25	3.81
BH-102	1.20	26.50	24.00	18.00	470.98	219.21	15.76	3.94	265.20	138.11	15.76	3.94
BH-102	1.20	28.00	25.50	19.50	495.15	238.95	16.19	4.05	278.88	150.50	16.19	4.05
BH-102	1.20	29.50	27.00	21.00	519.96	258.69	16.56	4.14	293.19	162.90	16.56	4.14
BH-102	1.20	30.00	27.50	21.50	528.22	265.27	16.87	4.22	297.96	167.03	16.87	4.22
BH-103	1.00	22.00	19.50	18.00	311.60	141.57	10.79	2.70	149.11	78.83	10.79	2.70
BH-103	1.00	23.50	21.00	19.50	331.33	157.03	11.14	2.79	158.64	87.15	11.14	2.79
BH-103	1.00	25.00	22.50	21.00	351.06	172.49	11.43	2.86	168.17	95.47	11.43	2.86
BH-103	1.00	26.50	24.00	22.50	370.79	187.95	11.68	2.92	177.70	103.79	11.68	2.92
BH-103	1.00	28.00	25.50	24.00	390.52	203.41	11.88	2.97	187.24	112.11	11.88	2.97
BH-103	1.00	29.50	27.00	25.50	410.25	218.87	12.05	3.01	196.77	120.43	12.05	3.01
BH-103	1.00	30.00	27.50	26.00	416.82	224.03	12.20	3.05	199.94	123.21	12.20	3.05
BH-103	1.20	22.00	19.50	18.00	450.42	184.79	14.04	3.51	237.95	109.50	14.04	3.51
BH-103	1.20	23.50	21.00	19.50	477.37	206.04	14.50	3.62	252.66	122.18	14.50	3.62
BH-103	1.20	25.00	22.50	21.00	504.32	227.28	14.87	3.72	267.38	134.85	14.87	3.72
BH-103	1.20	26.50	24.00	22.50	531.28	248.52	15.19	3.80	282.09	147.53	15.19	3.80
BH-103	1.20	28.00	25.50	24.00	558.23	269.77	15.46	3.86	296.81	160.21	15.46	3.86
BH-103	1.20	29.50	27.00	25.50	585.19	291.01	15.68	3.92	311.52	172.88	15.68	3.92
BH-103	1.20	30.00	27.50	26.00	594.17	298.09	15.87	3.97	316.43	177.11	15.87	3.97
BH-104	1.00	22.00	19.50	16.50	300.77	135.14	10.34	2.58	142.24	75.17	10.34	2.58
BH-104	1.00	23.50	21.00	18.00	320.27	150.44	10.80	2.70	151.54	83.33	10.80	2.70

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-104	1.00	25.00	22.50	19.50	339.77	165.74	11.18	2.79	160.84	91.49	11.18	2.79
BH-104	1.00	26.50	24.00	21.00	359.27	181.04	11.50	2.87	170.14	99.65	11.50	2.87
BH-104	1.00	28.00	25.50	22.50	378.77	196.34	11.77	2.94	179.44	107.81	11.77	2.94
BH-104	1.00	29.50	27.00	24.00	398.27	211.64	11.99	3.00	188.74	115.97	11.99	3.00
BH-104	1.00	30.00	27.50	24.50	404.77	216.74	12.18	3.05	191.84	118.69	12.18	3.05
BH-104	1.20	22.00	19.50	16.50	436.05	176.61	13.43	3.36	228.33	104.64	13.43	3.36
BH-104	1.20	23.50	21.00	18.00	462.69	197.63	14.03	3.51	242.74	117.10	14.03	3.51
BH-104	1.20	25.00	22.50	19.50	489.33	218.66	14.52	3.63	257.14	129.56	14.52	3.63
BH-104	1.20	26.50	24.00	21.00	515.98	239.68	14.94	3.73	271.54	142.02	14.94	3.73
BH-104	1.20	28.00	25.50	22.50	542.62	260.71	15.28	3.82	285.94	154.47	15.28	3.82
BH-104	1.20	29.50	27.00	24.00	569.26	281.73	15.58	3.90	300.35	166.93	15.58	3.90
BH-104	1.20	30.00	27.50	24.50	578.14	288.74	15.82	3.96	305.15	171.08	15.82	3.96
BH-105	1.00	22.00	19.50	18.00	323.59	147.25	10.91	2.73	159.48	83.37	10.91	2.73
BH-105	1.00	23.50	21.00	19.50	343.86	163.09	11.06	2.76	169.55	92.07	11.06	2.76
BH-105	1.00	25.00	22.50	21.00	364.13	178.93	11.35	2.84	179.62	100.77	11.35	2.84
BH-105	1.00	26.50	24.00	22.50	384.41	194.77	11.60	2.90	189.70	109.47	11.60	2.90
BH-105	1.00	28.00	25.50	24.00	404.68	210.61	11.81	2.95	199.77	118.18	11.81	2.95
BH-105	1.00	29.50	27.00	25.50	424.95	226.45	11.98	3.00	209.84	126.88	11.98	3.00
BH-105	1.00	30.00	27.50	26.00	431.71	231.73	12.13	3.03	213.20	129.78	12.13	3.03
BH-105	1.20	22.00	19.50	18.00	467.97	192.11	14.20	3.55	253.55	115.45	14.20	3.55
BH-105	1.20	23.50	21.00	19.50	495.75	213.93	14.39	3.60	269.10	128.71	14.39	3.60
BH-105	1.20	25.00	22.50	21.00	523.54	235.76	14.77	3.69	284.64	141.96	14.77	3.69
BH-105	1.20	26.50	24.00	22.50	551.32	257.58	15.09	3.77	300.19	155.22	15.09	3.77
BH-105	1.20	28.00	25.50	24.00	579.10	279.40	15.36	3.84	315.73	168.48	15.36	3.84
BH-105	1.20	29.50	27.00	25.50	606.89	301.23	15.59	3.90	331.27	181.73	15.59	3.90

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-105	1.20	30.00	27.50	26.00	616.15	308.50	15.77	3.94	336.45	186.15	15.77	3.94
BH-106	1.00	22.00	19.50	19.50	293.62	136.34	10.04	2.51	149.82	79.39	10.04	2.51
BH-106	1.00	23.50	21.00	21.00	311.90	150.79	10.19	2.55	159.36	87.72	10.19	2.55
BH-106	1.00	25.00	22.50	22.50	330.33	165.23	10.46	2.61	169.05	96.05	10.46	2.61
BH-106	1.00	26.50	24.00	24.00	348.61	179.68	10.68	2.67	178.59	104.37	10.68	2.67
BH-106	1.00	28.00	25.50	25.50	366.89	194.12	10.87	2.72	188.13	112.70	10.87	2.72
BH-106	1.00	29.50	27.00	27.00	385.17	208.57	11.03	2.76	197.66	121.02	11.03	2.76
BH-106	1.00	30.00	27.50	27.50	391.26	213.38	11.16	2.79	200.84	123.80	11.16	2.79
BH-106	1.20	22.00	19.50	19.50	426.13	178.42	13.15	3.29	238.59	110.09	13.15	3.29
BH-106	1.20	23.50	21.00	21.00	451.35	198.45	13.34	3.34	253.32	122.77	13.34	3.34
BH-106	1.20	25.00	22.50	22.50	476.83	218.47	13.69	3.42	268.31	135.45	13.69	3.42
BH-106	1.20	26.50	24.00	24.00	502.04	238.50	13.99	3.50	283.03	148.13	13.99	3.50
BH-106	1.20	28.00	25.50	25.50	527.26	258.52	14.23	3.56	297.75	160.81	14.23	3.56
BH-106	1.20	29.50	27.00	27.00	552.47	278.55	14.44	3.61	312.48	173.50	14.44	3.61
BH-106	1.20	30.00	27.50	27.50	560.88	285.22	14.61	3.65	317.39	177.72	14.61	3.65
BH-107	1.00	22.00	19.50	16.50	291.78	133.65	10.25	2.56	151.14	78.91	10.25	2.56
BH-107	1.00	23.50	21.00	18.00	310.32	148.28	10.73	2.68	160.94	87.42	10.73	2.68
BH-107	1.00	25.00	22.50	19.50	328.86	162.90	11.13	2.78	170.74	95.93	11.13	2.78
BH-107	1.00	26.50	24.00	21.00	347.40	177.53	11.48	2.87	180.54	104.44	11.48	2.87
BH-107	1.00	28.00	25.50	22.50	365.94	192.16	11.76	2.94	190.34	112.95	11.76	2.94
BH-107	1.00	29.50	27.00	24.00	384.48	206.79	12.00	3.00	200.13	121.45	12.00	3.00
BH-107	1.00	30.00	27.50	24.50	390.66	211.66	12.21	3.05	203.40	124.29	12.21	3.05
BH-107	1.20	22.00	19.50	16.50	424.27	175.06	13.31	3.33	240.52	109.37	13.31	3.33
BH-107	1.20	23.50	21.00	18.00	449.80	195.30	13.94	3.49	255.55	122.27	13.94	3.49
BH-107	1.20	25.00	22.50	19.50	475.32	215.55	14.46	3.62	270.59	135.18	14.46	3.62

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-107	1.20	26.50	24.00	21.00	500.85	235.79	14.91	3.73	285.62	148.08	14.91	3.73
BH-107	1.20	28.00	25.50	22.50	526.38	256.03	15.28	3.82	300.66	160.98	15.28	3.82
BH-107	1.20	29.50	27.00	24.00	551.90	276.28	15.59	3.90	315.70	173.88	15.59	3.90
BH-107	1.20	30.00	27.50	24.50	560.41	283.02	15.86	3.96	320.71	178.18	15.86	3.96
BH-108	1.00	22.00	19.50	16.50	310.32	140.83	11.05	2.76	148.29	78.41	11.05	2.76
BH-108	1.00	23.50	21.00	18.00	330.02	156.26	11.45	2.86	157.80	86.71	11.45	2.86
BH-108	1.00	25.00	22.50	19.50	349.72	171.70	11.77	2.94	167.30	95.01	11.77	2.94
BH-108	1.00	26.50	24.00	21.00	369.42	187.14	12.05	3.01	176.80	103.31	12.05	3.01
BH-108	1.00	28.00	25.50	22.50	389.12	202.58	12.28	3.07	186.30	111.61	12.28	3.07
BH-108	1.00	29.50	27.00	24.00	408.82	218.02	12.48	3.12	195.80	119.91	12.48	3.12
BH-108	1.00	30.00	27.50	24.50	415.39	223.17	12.63	3.16	198.97	122.67	12.63	3.16
BH-108	1.20	22.00	19.50	16.50	451.07	184.39	14.35	3.59	239.15	109.49	14.35	3.59
BH-108	1.20	23.50	21.00	18.00	478.16	205.74	14.87	3.72	254.01	122.27	14.87	3.72
BH-108	1.20	25.00	22.50	19.50	505.26	227.08	15.29	3.82	268.87	135.04	15.29	3.82
BH-108	1.20	26.50	24.00	21.00	532.36	248.42	15.65	3.91	283.73	147.82	15.65	3.91
BH-108	1.20	28.00	25.50	22.50	559.45	269.76	15.95	3.99	298.58	160.59	15.95	3.99
BH-108	1.20	29.50	27.00	24.00	586.55	291.11	16.21	4.05	313.44	173.37	16.21	4.05
BH-108	1.20	30.00	27.50	24.50	595.58	298.22	16.41	4.10	318.39	177.63	16.41	4.10
BH-109	1.00	22.00	19.50	19.50	297.86	138.20	9.84	2.46	153.33	80.74	9.84	2.46
BH-109	1.00	23.50	21.00	21.00	316.34	152.79	10.17	2.54	163.07	89.21	10.17	2.54
BH-109	1.00	25.00	22.50	22.50	334.31	167.37	10.45	2.61	172.30	97.68	10.45	2.61
BH-109	1.00	26.50	24.00	24.00	352.79	181.96	10.69	2.67	182.04	106.14	10.69	2.67
BH-109	1.00	28.00	25.50	25.50	371.27	196.54	10.88	2.72	191.78	114.61	10.88	2.72
BH-109	1.00	29.50	27.00	27.00	389.76	211.13	11.05	2.76	201.52	123.08	11.05	2.76
BH-109	1.00	30.00	27.50	27.50	395.92	215.99	11.19	2.80	204.77	125.90	11.19	2.80

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-109	1.20	22.00	19.50	19.50	432.86	180.97	12.88	3.22	244.44	112.02	12.88	3.22
BH-109	1.20	23.50	21.00	21.00	458.41	201.22	13.32	3.33	259.50	124.93	13.32	3.33
BH-109	1.20	25.00	22.50	22.50	483.07	221.48	13.68	3.42	273.68	137.84	13.68	3.42
BH-109	1.20	26.50	24.00	24.00	508.62	241.73	13.99	3.50	288.73	150.76	13.99	3.50
BH-109	1.20	28.00	25.50	25.50	534.16	261.99	14.24	3.56	303.78	163.67	14.24	3.56
BH-109	1.20	29.50	27.00	27.00	559.71	282.25	14.46	3.62	318.84	176.58	14.46	3.62
BH-109	1.20	30.00	27.50	27.50	568.22	289.00	14.64	3.66	323.86	180.89	14.64	3.66

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-101	-
Chainage	10+631	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	204.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-101	1.00	22.00	19.50	18.00	324.35	147.97	11.08	2.77
BH-101	1.00	23.50	21.00	19.50	344.59	163.79	11.41	2.85
BH-101	1.00	25.00	22.50	21.00	364.82	179.60	11.68	2.92
BH-101	1.00	26.50	24.00	22.50	385.06	195.42	11.91	2.98
BH-101	1.00	28.00	25.50	24.00	405.29	211.23	12.09	3.02
BH-101	1.00	29.50	27.00	25.50	425.53	227.04	12.25	3.06
BH-101	1.00	30.00	27.50	26.00	432.27	232.31	12.38	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	4.75	5.50	38.25	51.00	4.71	8.21	61.00	69.21	27.69	8.35
3	5.50	7.00	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	63.75	76.50	4.71	13.68	87.52	109.41	43.76	13.83
4	7.00	8.50	1.50	Granular	19.00	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	90.75	105.00	4.71	19.48	118.09	159.46	63.78	20.93
5	8.50	10.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	9.25	10.00	119.25	133.50	4.71	27.56	199.23	268.16	107.26	30.30
6	10.00	11.50	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	10.75	11.50	147.75	162.00	4.71	34.15	239.25	342.33	136.93	41.51
7	11.50	13.00	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	176.25	190.50	4.71	42.19	315.42	460.68	184.27	54.97
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	197.40	204.29	4.71	47.25	330.49	523.01	209.20	69.85
9	14.50	16.00	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	204.29	204.29	4.71	48.90	330.84	572.26	228.90	85.19
10	16.00	17.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	204.29	204.29	4.71	48.90	330.84	621.16	248.46	100.53
11	17.50	19.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	204.29	204.29	4.71	50.59	368.79	709.70	283.88	116.35
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	204.29	204.29	4.71	50.59	368.79	760.29	304.12	132.16
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	204.29	204.29	4.71	50.59	368.79	810.88	324.35	147.97
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	204.29	204.29	4.71	50.59	368.79	861.47	344.59	163.79
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	204.29	204.29	4.71	50.59	368.79	912.05	364.82	179.60
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	204.29	204.29	4.71	50.59	368.79	962.64	385.06	195.42
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	204.29	204.29	4.71	50.59	368.79	1013.23	405.29	211.23
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	204.29	204.29	4.71	50.59	368.79	1063.82	425.53	227.04
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	204.29	204.29	1.57	16.86	368.79	1080.68	432.27	232.31

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.14E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.180	0.722	11.08	2.77	37.73	17.28	26.60	6.65	90.56	41.47
2	22.50	23	2.96E+07	4.91E-02	3.28E+03	3.38	1.18	1.99	1.83	6.74	6.18	0.175	0.701	11.41	2.85	38.47	17.62	27.38	6.85	92.33	42.29
3	24.00	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.685	11.68	2.92	39.07	17.90	28.03	7.01	93.77	42.97
4	25.50	25	2.96E+07	4.91E-02	3.51E+03	3.34	1.20	1.99	1.83	6.65	6.09	0.168	0.672	11.91	2.98	39.58	18.14	28.57	7.14	94.98	43.53
5	27.00	25	2.96E+07	4.91E-02	3.60E+03	3.32	1.20	1.99	1.83	6.61	6.06	0.165	0.662	12.09	3.02	39.99	18.33	29.02	7.26	95.98	44.00
6	28.50	26	2.96E+07	4.91E-02	3.67E+03	3.31	1.21	1.99	1.83	6.59	6.04	0.163	0.653	12.25	3.06	40.34	18.50	29.40	7.35	96.82	44.39
7	30.00	26	2.96E+07	4.91E-02	3.73E+03	3.30	1.21	1.99	1.83	6.56	6.02	0.162	0.646	12.38	3.10	40.62	18.63	29.71	7.43	97.50	44.71

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-101	-
Chainage	10+631	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	233.37	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-101	1.20	22.00	19.50	18.00	468.82	192.97	14.42	3.61
BH-101	1.20	23.50	21.00	19.50	496.56	214.76	14.85	3.71
BH-101	1.20	25.00	22.50	21.00	524.30	236.56	15.19	3.80
BH-101	1.20	26.50	24.00	22.50	552.04	258.35	15.49	3.87
BH-101	1.20	28.00	25.50	24.00	579.78	280.14	15.73	3.93
BH-101	1.20	29.50	27.00	25.50	607.52	301.93	15.94	3.98
BH-101	1.20	30.00	27.50	26.00	616.76	309.20	16.11	4.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	4.75	5.50	38.25	51.00	5.65	9.85	90.14	99.99	40.00	11.47
3	5.50	7.00	1.50	Granular	17.00	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	63.75	76.50	5.65	16.42	128.32	154.59	61.84	18.44
4	7.00	8.50	1.50	Granular	19.00	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	90.75	105.00	5.65	23.37	172.62	222.26	88.90	27.36
5	8.50	10.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	9.25	10.00	119.25	133.50	5.65	33.07	290.28	372.99	149.20	38.99
6	10.00	11.50	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	10.75	11.50	147.75	162.00	5.65	40.98	347.91	471.60	188.64	52.84
7	11.50	13.00	1.50	Granular	19.00	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	176.25	190.50	5.65	50.63	457.99	632.31	252.92	69.39
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	197.40	204.29	5.65	56.70	477.74	708.76	283.51	87.64
9	14.50	16.00	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	211.56	218.83	5.65	60.77	511.56	803.35	321.34	107.03
10	16.00	17.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	226.10	233.37	5.65	64.95	544.78	901.52	360.61	127.60
11	17.50	19.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	233.37	233.37	5.65	69.35	607.28	1033.36	413.34	149.39
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	233.37	233.37	5.65	69.35	607.28	1102.71	441.08	171.18
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	233.37	233.37	5.65	69.35	607.28	1172.05	468.82	192.97
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	233.37	233.37	5.65	69.35	607.28	1241.40	496.56	214.76
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	233.37	233.37	5.65	69.35	607.28	1310.75	524.30	236.56
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	233.37	233.37	5.65	69.35	607.28	1380.09	552.04	258.35
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	233.37	233.37	5.65	69.35	607.28	1449.44	579.78	280.14
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	233.37	233.37	5.65	69.35	607.28	1518.79	607.52	301.93
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	233.37	233.37	1.88	23.12	607.28	1541.90	616.76	309.20

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.14E+03	3.95	1.01	2.01	1.83	7.95	7.24	0.139	0.555	14.42	3.61	57.35	26.10	34.61	8.65	137.64	62.63
2	22.50	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.02	2.01	1.83	7.88	7.17	0.135	0.539	14.85	3.71	58.47	26.62	35.63	8.91	140.33	63.88
3	24.00	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.82	7.12	0.132	0.527	15.19	3.80	59.38	27.04	36.46	9.12	142.51	64.89
4	25.50	25	2.96E+07	1.02E-01	3.51E+03	3.86	1.04	2.01	1.83	7.77	7.07	0.129	0.517	15.49	3.87	60.14	27.39	37.17	9.29	144.35	65.75
5	27.00	25	2.96E+07	1.02E-01	3.60E+03	3.84	1.04	2.01	1.83	7.73	7.04	0.127	0.509	15.73	3.93	60.77	27.69	37.75	9.44	145.85	66.44
6	28.50	26	2.96E+07	1.02E-01	3.67E+03	3.83	1.05	2.01	1.83	7.69	7.01	0.125	0.502	15.94	3.98	61.30	27.93	38.25	9.56	147.13	67.04
7	30.00	26	2.96E+07	1.02E-01	3.73E+03	3.81	1.05	2.01	1.83	7.67	6.99	0.124	0.497	16.11	4.03	61.73	28.13	38.65	9.66	148.15	67.51

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-102	-
Chainage	10+709	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	183.21	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Ground Water Table From OGL	12.85	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-102	1.00	22.00	19.50	13.50	271.85	121.66	10.66	2.66
BH-102	1.00	23.50	21.00	15.00	289.99	136.02	11.22	2.80
BH-102	1.00	25.00	22.50	16.50	308.14	150.37	11.68	2.92
BH-102	1.00	26.50	24.00	18.00	326.29	164.72	12.07	3.02
BH-102	1.00	28.00	25.50	19.50	344.07	179.07	12.39	3.10
BH-102	1.00	29.50	27.00	21.00	362.21	193.42	12.67	3.17
BH-102	1.00	30.00	27.50	21.50	368.26	198.21	12.90	3.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.25	0.00	25	-	10.00	10.88	1.00	-	6.25	7.00	62.44	75.38	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.25	0.00	25	-	10.00	10.88	1.00	-	7.75	8.50	88.31	101.25	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	17.25	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	114.19	127.13	4.71	24.51	140.28	164.78	65.91	17.86
6	10.00	11.50	1.50	Granular	19.00	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	141.38	155.63	4.71	30.34	170.73	225.58	90.23	28.00
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	162.52	169.42	4.71	36.22	212.04	303.10	121.24	39.79
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	176.31	183.21	4.71	39.29	228.89	359.25	143.70	52.44
9	14.50	16.00	1.50	Granular	8.49	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	183.21	183.21	4.71	42.34	262.53	435.23	174.09	65.95
10	16.00	17.50	1.50	Granular	8.49	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	183.21	183.21	4.71	42.34	262.53	477.58	191.03	79.45
11	17.50	19.00	1.50	Granular	8.49	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	183.21	183.21	4.71	43.85	296.55	555.45	222.18	93.38
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	183.21	183.21	4.71	43.85	297.39	600.14	240.06	107.31
13	20.50	22.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	183.21	183.21	4.71	45.37	331.50	679.62	271.85	121.66
14	22.00	23.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	183.21	183.21	4.71	45.37	331.50	724.99	289.99	136.02
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	183.21	183.21	4.71	45.37	331.50	770.35	308.14	150.37
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	183.21	183.21	4.71	45.37	331.50	815.72	326.29	164.72
17	26.50	28.00	1.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	183.21	183.21	4.71	45.37	330.58	860.16	344.07	179.07
18	28.00	29.50	1.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	183.21	183.21	4.71	45.37	330.58	905.53	362.21	193.42
19	29.50	30.00	0.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	183.21	183.21	1.57	15.12	330.58	920.65	368.26	198.21

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.34E+03	3.62	2.35	1.91	1.80	6.90	6.50	0.188	0.751	10.66	2.66	36.76	17.33	25.57	6.39	88.22	41.58
2	22.50	18	2.96E+07	4.91E-02	2.54E+03	3.56	2.39	1.90	1.80	6.78	6.40	0.178	0.713	11.22	2.80	38.03	17.94	26.92	6.73	91.28	43.05
3	24.00	19	2.96E+07	4.91E-02	2.71E+03	3.52	2.42	1.90	1.80	6.69	6.31	0.171	0.685	11.68	2.92	39.07	18.43	28.02	7.01	93.76	44.24
4	25.50	20	2.96E+07	4.91E-02	2.85E+03	3.48	2.44	1.90	1.80	6.62	6.25	0.166	0.663	12.07	3.02	39.93	18.85	28.96	7.24	95.84	45.23
5	27.00	21	2.96E+07	4.91E-02	2.97E+03	3.45	2.46	1.90	1.80	6.56	6.19	0.161	0.646	12.39	3.10	40.65	19.19	29.74	7.44	97.56	46.06
6	28.50	22	2.96E+07	4.91E-02	3.08E+03	3.43	2.48	1.90	1.80	6.51	6.15	0.158	0.631	12.67	3.17	41.26	19.48	30.41	7.60	99.02	46.76
7	30.00	22	2.96E+07	4.91E-02	3.17E+03	3.41	2.50	1.90	1.80	6.47	6.11	0.155	0.620	12.90	3.23	41.76	19.72	30.97	7.74	100.23	47.34

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-102	-
Chainage	10+709	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	208.69	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Ground Water Table From OGL	12.85	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-102	1.20	22.00	19.50	13.50	396.57	160.00	13.90	3.48
BH-102	1.20	23.50	21.00	15.00	421.37	179.74	14.64	3.66
BH-102	1.20	25.00	22.50	16.50	446.18	199.48	15.25	3.81
BH-102	1.20	26.50	24.00	18.00	470.98	219.21	15.76	3.94
BH-102	1.20	28.00	25.50	19.50	495.15	238.95	16.19	4.05
BH-102	1.20	29.50	27.00	21.00	519.96	258.69	16.56	4.14
BH-102	1.20	30.00	27.50	21.50	528.22	265.27	16.87	4.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.25	0.00	25	-	10.00	10.88	1.00	-	6.25	7.00	62.44	75.38	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.25	0.00	25	-	10.00	10.88	1.00	-	7.75	8.50	88.31	101.25	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	17.25	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	114.19	127.13	5.65	29.41	204.33	233.74	93.50	24.07
6	10.00	11.50	1.50	Granular	19.00	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	141.38	155.63	5.65	36.41	248.42	314.24	125.70	36.64
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	162.52	169.42	5.65	43.46	306.77	416.05	166.42	51.18
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	176.31	183.21	5.65	47.15	331.04	487.47	194.99	66.76
9	14.50	16.00	1.50	Granular	8.49	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	189.58	195.95	5.65	52.58	405.32	614.33	245.73	83.86
10	16.00	17.50	1.50	Granular	8.49	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	202.32	208.69	5.65	56.11	431.08	696.20	278.48	101.94
11	17.50	19.00	1.50	Granular	8.49	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	208.69	208.69	5.65	59.94	486.95	812.01	324.80	121.10
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	208.69	208.69	5.65	59.94	488.38	873.39	349.36	140.26
13	20.50	22.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	208.69	208.69	5.65	62.01	544.40	991.42	396.57	160.00
14	22.00	23.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	208.69	208.69	5.65	62.01	544.40	1053.44	421.37	179.74
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	208.69	208.69	5.65	62.01	544.40	1115.45	446.18	199.48
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	208.69	208.69	5.65	62.01	544.40	1177.46	470.98	219.21
17	26.50	28.00	1.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	208.69	208.69	5.65	62.01	542.81	1237.88	495.15	238.95
18	28.00	29.50	1.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	208.69	208.69	5.65	62.01	542.81	1299.89	519.96	258.69
19	29.50	30.00	0.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	208.69	208.69	1.88	20.67	542.81	1320.56	528.22	265.27

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.34E+03	4.19	2.03	1.92	1.80	8.05	7.55	0.144	0.575	13.90	3.48	55.97	26.24	33.37	8.34	134.32	62.99
2	22.50	18	2.96E+07	1.02E-01	2.54E+03	4.12	2.06	1.92	1.80	7.91	7.43	0.137	0.546	14.64	3.66	57.93	27.18	35.14	8.78	139.03	65.24
3	24.00	19	2.96E+07	1.02E-01	2.71E+03	4.07	2.09	1.92	1.80	7.81	7.33	0.131	0.525	15.25	3.81	59.52	27.94	36.59	9.15	142.84	67.06
4	25.50	20	2.96E+07	1.02E-01	2.85E+03	4.03	2.11	1.92	1.80	7.72	7.25	0.127	0.508	15.76	3.94	60.85	28.58	37.83	9.46	146.03	68.58
5	27.00	21	2.96E+07	1.02E-01	2.97E+03	3.99	2.13	1.92	1.80	7.65	7.19	0.124	0.494	16.19	4.05	61.95	29.10	38.85	9.71	148.67	69.84
6	28.50	22	2.96E+07	1.02E-01	3.08E+03	3.96	2.14	1.92	1.80	7.60	7.14	0.121	0.483	16.56	4.14	62.88	29.55	39.74	9.94	150.92	70.92
7	30.00	22	2.96E+07	1.02E-01	3.17E+03	3.94	2.16	1.92	1.80	7.55	7.10	0.119	0.474	16.87	4.22	63.66	29.92	40.48	10.12	152.78	71.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-103	-
Chainage	10+821	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	199.19	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-103	1.00	22.00	19.50	18.00	311.60	141.57	10.79	2.70
BH-103	1.00	23.50	21.00	19.50	331.33	157.03	11.14	2.79
BH-103	1.00	25.00	22.50	21.00	351.06	172.49	11.43	2.86
BH-103	1.00	26.50	24.00	22.50	370.79	187.95	11.68	2.92
BH-103	1.00	28.00	25.50	24.00	390.52	203.41	11.88	2.97
BH-103	1.00	29.50	27.00	25.50	410.25	218.87	12.05	3.01
BH-103	1.00	30.00	27.50	26.00	416.82	224.03	12.20	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	4.71	6.74	32.20	38.94	15.58	7.94
3	5.50	7.00	1.50	Granular	17.85	0.03	22	-	4.00	7.59	1.00	-	6.25	7.00	62.89	76.28	4.71	11.42	48.42	66.58	26.63	12.78
4	7.00	8.50	1.50	Granular	17.85	0.03	22	-	4.00	7.59	1.00	-	7.75	8.50	89.66	103.05	4.71	16.28	64.43	98.88	39.55	18.99
5	8.50	10.00	1.50	Granular	18.30	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	116.78	130.50	4.71	26.99	194.58	256.02	102.41	28.20
6	10.00	11.50	1.50	Granular	18.30	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	144.23	157.95	4.71	33.33	233.13	327.90	131.16	39.18
7	11.50	13.00	1.50	Granular	18.30	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	171.68	185.40	4.71	38.26	236.52	369.55	147.82	51.54
8	13.00	14.50	1.50	Granular	9.19	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	192.30	199.19	4.71	42.86	248.42	424.31	169.72	65.19
9	14.50	16.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	199.19	199.19	4.71	47.68	322.40	545.96	218.39	80.19
10	16.00	17.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	199.19	199.19	4.71	47.68	322.40	593.64	237.46	95.19
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	199.19	199.19	4.71	49.33	359.77	680.34	272.14	110.65
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	199.19	199.19	4.71	49.33	359.77	729.67	291.87	126.11
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	199.19	199.19	4.71	49.33	359.77	778.99	311.60	141.57
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	199.19	199.19	4.71	49.33	359.77	828.32	331.33	157.03
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	199.19	199.19	4.71	49.33	359.77	877.64	351.06	172.49
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	199.19	199.19	4.71	49.33	359.77	926.97	370.79	187.95
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	199.19	199.19	4.71	49.33	359.77	976.29	390.52	203.41
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	199.19	199.19	4.71	49.33	359.77	1025.62	410.25	218.87
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	199.19	199.19	1.57	16.44	359.77	1042.06	416.82	224.03

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	3.01E+03	3.44	1.16	2.00	1.83	6.87	6.29	0.185	0.741	10.79	2.70	37.06	16.97	25.90	6.47	88.96	40.72
2	22.50	22	2.96E+07	4.91E-02	3.16E+03	3.41	1.17	2.00	1.83	6.80	6.22	0.179	0.718	11.14	2.79	37.87	17.34	26.74	6.69	90.88	41.62
3	24.00	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.18	1.99	1.83	6.74	6.17	0.175	0.700	11.43	2.86	38.52	17.65	27.44	6.86	92.45	42.35
4	25.50	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.685	11.68	2.92	39.07	17.90	28.03	7.01	93.77	42.97
5	27.00	25	2.96E+07	4.91E-02	3.50E+03	3.34	1.20	1.99	1.83	6.65	6.10	0.168	0.673	11.88	2.97	39.52	18.11	28.51	7.13	94.85	43.47
6	28.50	25	2.96E+07	4.91E-02	3.58E+03	3.32	1.20	1.99	1.83	6.62	6.07	0.166	0.664	12.05	3.01	39.91	18.29	28.93	7.23	95.77	43.90
7	30.00	26	2.96E+07	4.91E-02	3.64E+03	3.31	1.21	1.99	1.83	6.60	6.05	0.164	0.656	12.20	3.05	40.22	18.44	29.27	7.32	96.52	44.25

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-103	-
Chainage	10+821	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	226.77	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-103	1.20	22.00	19.50	18.00	450.42	184.79	14.04	3.51
BH-103	1.20	23.50	21.00	19.50	477.37	206.04	14.50	3.62
BH-103	1.20	25.00	22.50	21.00	504.32	227.28	14.87	3.72
BH-103	1.20	26.50	24.00	22.50	531.28	248.52	15.19	3.80
BH-103	1.20	28.00	25.50	24.00	558.23	269.77	15.46	3.86
BH-103	1.20	29.50	27.00	25.50	585.19	291.01	15.68	3.92
BH-103	1.20	30.00	27.50	26.00	594.17	298.09	15.87	3.97

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	5.65	8.09	47.12	55.21	22.08	10.97
3	5.50	7.00	1.50	Granular	17.85	0.03	22	-	4.00	7.59	1.00	-	6.25	7.00	62.89	76.28	5.65	13.70	70.54	92.33	36.93	17.19
4	7.00	8.50	1.50	Granular	17.85	0.03	22	-	4.00	7.59	1.00	-	7.75	8.50	89.66	103.05	5.65	19.54	93.59	134.93	53.97	25.03
5	8.50	10.00	1.50	Granular	18.30	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	116.78	130.50	5.65	32.39	283.46	357.18	142.87	36.48
6	10.00	11.50	1.50	Granular	18.30	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	144.23	157.95	5.65	40.00	338.97	452.69	181.08	50.05
7	11.50	13.00	1.50	Granular	18.30	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	171.68	185.40	5.65	45.91	343.46	503.09	201.24	65.28
8	13.00	14.50	1.50	Granular	9.19	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	192.30	199.19	5.65	51.43	359.17	570.23	228.09	82.06
9	14.50	16.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	206.09	212.98	5.65	59.20	497.60	767.85	307.14	101.01
10	16.00	17.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	219.88	226.77	5.65	63.16	529.10	862.52	345.01	121.07
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	226.77	226.77	5.65	67.39	590.47	991.27	396.51	142.31
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	226.77	226.77	5.65	67.39	590.47	1058.65	423.46	163.55
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	226.77	226.77	5.65	67.39	590.47	1126.04	450.42	184.79
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	226.77	226.77	5.65	67.39	590.47	1193.42	477.37	206.04
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	226.77	226.77	5.65	67.39	590.47	1260.81	504.32	227.28
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	226.77	226.77	5.65	67.39	590.47	1328.19	531.28	248.52
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	226.77	226.77	5.65	67.39	590.47	1395.58	558.23	269.77
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	226.77	226.77	5.65	67.39	590.47	1462.97	585.19	291.01
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	226.77	226.77	1.88	22.46	590.47	1485.43	594.17	298.09

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	3.01E+03	3.98	1.00	2.02	1.83	8.02	7.30	0.142	0.570	14.04	3.51	56.34	25.63	33.70	8.43	135.21	61.51
2	22.50	22	2.96E+07	1.02E-01	3.16E+03	3.94	1.01	2.01	1.83	7.94	7.23	0.138	0.552	14.50	3.62	57.56	26.19	34.80	8.70	138.13	62.86
3	24.00	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.02	2.01	1.83	7.87	7.17	0.134	0.538	14.87	3.72	58.54	26.65	35.70	8.92	140.50	63.96
4	25.50	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.82	7.12	0.132	0.527	15.19	3.80	59.38	27.04	36.46	9.12	142.50	64.89
5	27.00	25	2.96E+07	1.02E-01	3.50E+03	3.86	1.04	2.01	1.83	7.77	7.08	0.129	0.518	15.46	3.86	60.06	27.36	37.10	9.27	144.15	65.65
6	28.50	25	2.96E+07	1.02E-01	3.58E+03	3.85	1.04	2.01	1.83	7.73	7.05	0.128	0.510	15.68	3.92	60.64	27.63	37.64	9.41	145.55	66.30
7	30.00	26	2.96E+07	1.02E-01	3.64E+03	3.83	1.04	2.01	1.83	7.70	7.02	0.126	0.504	15.87	3.97	61.12	27.85	38.08	9.52	146.68	66.83

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-104	-
Chainage	10+946	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	196.87	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-104	1.00	22.00	19.50	16.50	300.77	135.14	10.34	2.58
BH-104	1.00	23.50	21.00	18.00	320.27	150.44	10.80	2.70
BH-104	1.00	25.00	22.50	19.50	339.77	165.74	11.18	2.79
BH-104	1.00	26.50	24.00	21.00	359.27	181.04	11.50	2.87
BH-104	1.00	28.00	25.50	22.50	378.77	196.34	11.77	2.94
BH-104	1.00	29.50	27.00	24.00	398.27	211.64	11.99	3.00
BH-104	1.00	30.00	27.50	24.50	404.77	216.74	12.18	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.25	0.03	22	-	4.00	7.59	1.00	-	6.25	7.00	62.44	75.38	4.71	11.34	47.79	59.13	23.65	10.87
4	7.00	8.50	1.50	Granular	17.25	0.03	22	-	4.00	7.59	1.00	-	7.75	8.50	88.31	101.25	4.71	16.04	63.26	90.64	36.25	17.01
5	8.50	10.00	1.50	Granular	17.25	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	114.19	127.13	4.71	24.51	140.28	192.16	76.86	25.52
6	10.00	11.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	141.38	155.63	4.71	30.34	170.73	252.96	101.18	35.67
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	169.88	184.13	4.71	39.26	270.32	391.81	156.72	48.31
8	13.00	14.50	1.50	Granular	8.49	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	190.50	196.87	4.71	44.03	281.71	447.22	178.89	62.29
9	14.50	16.00	1.50	Granular	8.49	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	196.87	196.87	4.71	43.87	245.20	454.59	181.83	76.22
10	16.00	17.50	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	196.87	196.87	4.71	43.87	245.85	499.11	199.65	90.15
11	17.50	19.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	196.87	196.87	4.71	47.12	319.06	619.44	247.78	105.00
12	19.00	20.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	196.87	196.87	4.71	47.12	319.06	666.57	266.63	119.84
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	196.87	196.87	4.71	48.75	355.66	751.92	300.77	135.14
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	196.87	196.87	4.71	48.75	355.66	800.67	320.27	150.44
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	196.87	196.87	4.71	48.75	355.66	849.42	339.77	165.74
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	196.87	196.87	4.71	48.75	355.66	898.17	359.27	181.04
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	196.87	196.87	4.71	48.75	355.66	946.92	378.77	196.34
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	196.87	196.87	4.71	48.75	355.66	995.66	398.27	211.64
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	196.87	196.87	1.57	16.25	355.66	1011.91	404.77	216.74

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.54E+03	3.56	1.55	1.96	1.82	6.97	6.46	0.193	0.774	10.34	2.58	36.02	16.70	24.81	6.20	86.46	40.08
2	22.50	19	2.96E+07	4.91E-02	2.72E+03	3.51	1.57	1.96	1.81	6.87	6.37	0.185	0.741	10.80	2.70	37.08	17.20	25.92	6.48	89.00	41.28
3	24.00	20	2.96E+07	4.91E-02	2.87E+03	3.47	1.58	1.95	1.81	6.79	6.30	0.179	0.716	11.18	2.79	37.95	17.61	26.82	6.71	91.07	42.26
4	25.50	21	2.96E+07	4.91E-02	3.00E+03	3.44	1.60	1.95	1.81	6.73	6.24	0.174	0.696	11.50	2.87	38.67	17.95	27.60	6.90	92.81	43.08
5	27.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.67	6.20	0.170	0.680	11.77	2.94	39.27	18.23	28.24	7.06	94.24	43.76
6	28.50	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.667	11.99	3.00	39.77	18.47	28.79	7.20	95.45	44.34
7	30.00	23	2.96E+07	4.91E-02	3.28E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.657	12.18	3.05	40.18	18.67	29.23	7.31	96.44	44.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-104	-
Chainage	10+946	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	224.15	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-104	1.20	22.00	19.50	16.50	436.05	176.61	13.43	3.36
BH-104	1.20	23.50	21.00	18.00	462.69	197.63	14.03	3.51
BH-104	1.20	25.00	22.50	19.50	489.33	218.66	14.52	3.63
BH-104	1.20	26.50	24.00	21.00	515.98	239.68	14.94	3.73
BH-104	1.20	28.00	25.50	22.50	542.62	260.71	15.28	3.82
BH-104	1.20	29.50	27.00	24.00	569.26	281.73	15.58	3.90
BH-104	1.20	30.00	27.50	24.50	578.14	288.74	15.82	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.25	0.03	22	-	4.00	7.59	1.00	-	6.25	7.00	62.44	75.38	5.65	13.61	69.60	83.21	33.28	14.89
4	7.00	8.50	1.50	Granular	17.25	0.03	22	-	4.00	7.59	1.00	-	7.75	8.50	88.31	101.25	5.65	19.24	91.88	124.73	49.89	22.66
5	8.50	10.00	1.50	Granular	17.25	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	114.19	127.13	5.65	29.41	204.33	266.59	106.64	33.27
6	10.00	11.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	141.38	155.63	5.65	36.41	248.42	347.09	138.84	45.84
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	169.88	184.13	5.65	47.11	392.65	538.43	215.37	61.40
8	13.00	14.50	1.50	Granular	8.49	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	190.50	196.87	5.65	52.83	407.18	605.79	242.32	78.57
9	14.50	16.00	1.50	Granular	8.49	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	203.24	209.61	5.65	54.35	376.84	629.81	251.92	96.16
10	16.00	17.50	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	216.88	224.15	5.65	58.00	403.55	714.52	285.81	114.78
11	17.50	19.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	224.15	224.15	5.65	64.39	523.70	899.06	359.62	135.18
12	19.00	20.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	224.15	224.15	5.65	64.39	523.70	963.44	385.38	155.59
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	224.15	224.15	5.65	66.61	583.78	1090.12	436.05	176.61
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	224.15	224.15	5.65	66.61	583.78	1156.73	462.69	197.63
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	224.15	224.15	5.65	66.61	583.78	1223.33	489.33	218.66
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	224.15	224.15	5.65	66.61	583.78	1289.94	515.98	239.68
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	224.15	224.15	5.65	66.61	583.78	1356.54	542.62	260.71
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	224.15	224.15	5.65	66.61	583.78	1423.15	569.26	281.73
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	224.15	224.15	1.88	22.20	583.78	1445.35	578.14	288.74

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.54E+03	4.12	1.34	1.98	1.82	8.14	7.50	0.149	0.596	13.43	3.36	54.69	25.19	32.24	8.06	131.26	60.45
2	22.50	19	2.96E+07	1.02E-01	2.72E+03	4.06	1.35	1.98	1.82	8.03	7.40	0.143	0.570	14.03	3.51	56.30	25.94	33.67	8.42	135.13	62.27
3	24.00	20	2.96E+07	1.02E-01	2.87E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.551	14.52	3.63	57.61	26.56	34.85	8.71	138.26	63.74
4	25.50	21	2.96E+07	1.02E-01	3.00E+03	3.98	1.38	1.97	1.82	7.86	7.25	0.134	0.536	14.94	3.73	58.71	27.08	35.85	8.96	140.90	64.99
5	27.00	22	2.96E+07	1.02E-01	3.11E+03	3.95	1.39	1.97	1.82	7.80	7.20	0.131	0.523	15.28	3.82	59.61	27.50	36.68	9.17	143.07	66.01
6	28.50	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.58	3.90	60.38	27.87	37.39	9.35	144.92	66.88
7	30.00	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.506	15.82	3.96	61.01	28.16	37.98	9.49	146.42	67.58

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-105	-
Chainage	11+034	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	204.67	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-105	1.00	22.00	19.50	18.00	323.59	147.25	10.91	2.73
BH-105	1.00	23.50	21.00	19.50	343.86	163.09	11.06	2.76
BH-105	1.00	25.00	22.50	21.00	364.13	178.93	11.35	2.84
BH-105	1.00	26.50	24.00	22.50	384.41	194.77	11.60	2.90
BH-105	1.00	28.00	25.50	24.00	404.68	210.61	11.81	2.95
BH-105	1.00	29.50	27.00	25.50	424.95	226.45	11.98	3.00
BH-105	1.00	30.00	27.50	26.00	431.71	231.73	12.13	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.85	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.39	26.78	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.85	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	40.16	53.55	4.71	7.29	34.83	42.13	16.85	8.09
3	5.50	7.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	66.94	80.33	4.71	14.92	107.87	130.08	52.03	13.92
4	7.00	8.50	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	93.71	107.10	4.71	20.89	140.59	183.69	73.48	21.41
5	8.50	10.00	1.50	Granular	17.85	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	120.49	133.88	4.71	26.85	173.31	243.26	97.30	30.58
6	10.00	11.50	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	148.13	162.38	4.71	33.01	208.77	311.73	124.69	41.47
7	11.50	13.00	1.50	Granular	19.00	0.01	28	-	15.70	17.82	1.00	-	12.25	13.00	176.63	190.88	4.71	40.82	279.80	423.59	169.43	54.55
8	13.00	14.50	1.50	Granular	9.19	0.01	28	-	15.70	17.82	1.00	-	13.75	14.50	197.77	204.67	4.71	45.71	293.10	482.59	193.04	69.00
9	14.50	16.00	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	204.67	204.67	4.71	48.99	331.43	569.92	227.97	84.37
10	16.00	17.50	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	204.67	204.67	4.71	48.99	331.43	618.91	247.56	99.74
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	204.67	204.67	4.71	50.68	369.46	707.61	283.04	115.58
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	204.67	204.67	4.71	50.68	369.46	758.29	303.32	131.41
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	204.67	204.67	4.71	50.68	369.46	808.97	323.59	147.25
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	204.67	204.67	4.71	50.68	369.46	859.65	343.86	163.09
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	204.67	204.67	4.71	50.68	369.46	910.34	364.13	178.93
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	204.67	204.67	4.71	50.68	369.46	961.02	384.41	194.77
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	204.67	204.67	4.71	50.68	369.46	1011.70	404.68	210.61
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	204.67	204.67	4.71	50.68	369.46	1062.38	424.95	226.45
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	204.67	204.67	1.57	16.89	369.46	1079.27	431.71	231.73

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.06E+03	3.43	1.17	2.00	1.83	6.84	6.27	0.183	0.733	10.91	2.73	37.34	17.10	26.19	6.55	89.62	41.03
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.76	37.68	17.25	26.54	6.64	90.43	41.40
3	24.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.18	1.99	1.83	6.75	6.19	0.176	0.705	11.35	2.84	38.34	17.56	27.24	6.81	92.02	42.15
4	25.50	24	2.96E+07	4.91E-02	3.37E+03	3.36	1.19	1.99	1.83	6.71	6.15	0.172	0.690	11.60	2.90	38.90	17.82	27.84	6.96	93.36	42.77
5	27.00	24	2.96E+07	4.91E-02	3.46E+03	3.35	1.20	1.99	1.83	6.67	6.11	0.169	0.678	11.81	2.95	39.36	18.04	28.34	7.08	94.46	43.29
6	28.50	25	2.96E+07	4.91E-02	3.55E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.167	0.668	11.98	3.00	39.75	18.22	28.76	7.19	95.40	43.73
7	30.00	25	2.96E+07	4.91E-02	3.61E+03	3.32	1.21	1.99	1.83	6.61	6.06	0.165	0.660	12.13	3.03	40.06	18.37	29.10	7.28	96.15	44.08

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-105	-
Chainage	11+034	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	233.75	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-105	1.20	22.00	19.50	18.00	467.97	192.11	14.20	3.55
BH-105	1.20	23.50	21.00	19.50	495.75	213.93	14.39	3.60
BH-105	1.20	25.00	22.50	21.00	523.54	235.76	14.77	3.69
BH-105	1.20	26.50	24.00	22.50	551.32	257.58	15.09	3.77
BH-105	1.20	28.00	25.50	24.00	579.10	279.40	15.36	3.84
BH-105	1.20	29.50	27.00	25.50	606.89	301.23	15.59	3.90
BH-105	1.20	30.00	27.50	26.00	616.15	308.50	15.77	3.94

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.85	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	13.39	26.78	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.85	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	40.16	53.55	5.65	8.75	50.97	59.72	23.89	11.16
3	5.50	7.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	66.94	80.33	5.65	17.90	158.13	184.78	73.91	18.55
4	7.00	8.50	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	93.71	107.10	5.65	25.06	205.25	256.96	102.79	27.94
5	8.50	10.00	1.50	Granular	17.85	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	120.49	133.88	5.65	32.22	252.37	336.30	134.52	39.34
6	10.00	11.50	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	148.13	162.38	5.65	39.61	303.60	427.15	170.86	52.80
7	11.50	13.00	1.50	Granular	19.00	0.01	28	-	15.70	17.82	1.00	-	12.25	13.00	176.63	190.88	5.65	48.99	406.30	578.84	231.54	68.89
8	13.00	14.50	1.50	Granular	9.19	0.01	28	-	15.70	17.82	1.00	-	13.75	14.50	197.77	204.67	5.65	54.85	423.70	651.09	260.44	86.63
9	14.50	16.00	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	211.94	219.21	5.65	60.88	512.42	800.69	320.27	106.05
10	16.00	17.50	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	226.48	233.75	5.65	65.05	545.64	898.96	359.58	126.64
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	233.75	233.75	5.65	69.46	608.23	1031.01	412.40	148.46
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	233.75	233.75	5.65	69.46	608.23	1100.47	440.19	170.29
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	233.75	233.75	5.65	69.46	608.23	1169.93	467.97	192.11
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	233.75	233.75	5.65	69.46	608.23	1239.39	495.75	213.93
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	233.75	233.75	5.65	69.46	608.23	1308.84	523.54	235.76
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	233.75	233.75	5.65	69.46	608.23	1378.30	551.32	257.58
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	233.75	233.75	5.65	69.46	608.23	1447.76	579.10	279.40
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	233.75	233.75	5.65	69.46	608.23	1517.22	606.89	301.23
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	233.75	233.75	1.88	23.15	608.23	1540.37	616.15	308.50

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.06E+03	3.97	1.01	2.01	1.83	7.99	7.27	0.141	0.563	14.20	3.55	56.76	25.82	34.08	8.52	136.23	61.98
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.63	137.44	62.54
3	24.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.02	2.01	1.83	7.89	7.18	0.135	0.542	14.77	3.69	58.27	26.52	35.45	8.86	139.85	63.66
4	25.50	24	2.96E+07	1.02E-01	3.37E+03	3.89	1.03	2.01	1.83	7.83	7.13	0.133	0.530	15.09	3.77	59.12	26.92	36.22	9.06	141.88	64.60
5	27.00	24	2.96E+07	1.02E-01	3.46E+03	3.87	1.03	2.01	1.83	7.79	7.09	0.130	0.521	15.36	3.84	59.81	27.24	36.87	9.22	143.55	65.38
6	28.50	25	2.96E+07	1.02E-01	3.55E+03	3.85	1.04	2.01	1.83	7.75	7.06	0.128	0.513	15.59	3.90	60.40	27.51	37.41	9.35	144.97	66.04
7	30.00	25	2.96E+07	1.02E-01	3.61E+03	3.84	1.04	2.01	1.83	7.72	7.03	0.127	0.507	15.77	3.94	60.88	27.74	37.86	9.46	146.12	66.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-106	-
Chainage	11+134	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	184.56	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	12.90	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-106	1.00	22.00	19.50	19.50	293.62	136.34	10.04	2.51
BH-106	1.00	23.50	21.00	21.00	311.90	150.79	10.19	2.55
BH-106	1.00	25.00	22.50	22.50	330.33	165.23	10.46	2.61
BH-106	1.00	26.50	24.00	24.00	348.61	179.68	10.68	2.67
BH-106	1.00	28.00	25.50	25.50	366.89	194.12	10.87	2.72
BH-106	1.00	29.50	27.00	27.00	385.17	208.57	11.03	2.76
BH-106	1.00	30.00	27.50	27.50	391.26	213.38	11.16	2.79

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.05	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	4.71	2.63	28.57	31.20	12.48	5.13
2	4.00	5.50	1.50	Granular	17.25	0.05	25	-	10.00	10.88	1.00	-	4.75	5.50	38.44	51.38	4.71	7.93	50.86	61.42	24.57	9.01
3	5.50	7.00	1.50	Granular	17.25	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	64.31	77.25	4.71	13.27	73.05	96.88	38.75	14.37
4	7.00	8.50	1.50	Granular	17.25	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	90.19	103.13	4.71	19.36	115.32	158.51	63.40	21.44
5	8.50	10.00	1.50	Granular	18.30	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	116.85	130.58	4.71	25.08	144.36	212.62	85.05	30.11
6	10.00	11.50	1.50	Granular	18.30	0.11	27	-	13.80	15.50	1.00	-	10.75	11.50	144.30	158.03	4.71	32.16	203.07	303.50	121.40	40.76
7	11.50	13.00	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	12.25	13.00	164.40	170.77	4.71	36.64	213.31	350.37	140.15	52.67
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	177.66	184.56	4.71	41.06	264.86	442.98	177.19	65.82
9	14.50	16.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	184.56	184.56	4.71	42.65	264.86	485.64	194.26	79.41
10	16.00	17.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	184.56	184.56	4.71	44.18	299.18	564.14	225.66	93.43
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	184.56	184.56	4.71	44.18	299.18	608.32	243.33	107.45
12	19.00	20.50	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	184.56	184.56	4.71	45.70	333.50	688.34	275.34	121.89
13	20.50	22.00	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	184.56	184.56	4.71	45.70	333.50	734.04	293.62	136.34
14	22.00	23.50	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	184.56	184.56	4.71	45.70	333.50	779.74	311.90	150.79
15	23.50	25.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	184.56	184.56	4.71	45.70	333.89	825.83	330.33	165.23
16	25.00	26.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	184.56	184.56	4.71	45.70	333.89	871.53	348.61	179.68
17	26.50	28.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	184.56	184.56	4.71	45.70	333.89	917.23	366.89	194.12
18	28.00	29.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	184.56	184.56	4.71	45.70	333.89	962.93	385.17	208.57
19	29.50	30.00	0.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	184.56	184.56	1.57	15.23	333.89	978.16	391.26	213.38

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.07E+03	3.43	0.73	2.05	1.85	7.04	6.32	0.199	0.797	10.04	2.51	35.33	15.87	24.10	6.02	84.78	38.10
2	22.50	22	2.96E+07	4.91E-02	3.14E+03	3.41	0.73	2.05	1.85	7.00	6.29	0.196	0.785	10.19	2.55	35.68	16.04	24.46	6.12	85.64	38.49
3	24.00	23	2.96E+07	4.91E-02	3.28E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.46	2.61	36.30	16.32	25.10	6.27	87.12	39.16
4	25.50	24	2.96E+07	4.91E-02	3.39E+03	3.36	0.74	2.05	1.84	6.89	6.20	0.187	0.749	10.68	2.67	36.82	16.56	25.64	6.41	88.37	39.74
5	27.00	24	2.96E+07	4.91E-02	3.48E+03	3.34	0.75	2.05	1.84	6.85	6.16	0.184	0.736	10.87	2.72	37.25	16.75	26.09	6.52	89.40	40.21
6	28.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.725	11.03	2.76	37.62	16.92	26.48	6.62	90.28	40.61
7	30.00	25	2.96E+07	4.91E-02	3.63E+03	3.31	0.75	2.05	1.84	6.79	6.11	0.179	0.717	11.16	2.79	37.91	17.06	26.79	6.70	90.99	40.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-106	-
Chainage	11+134	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	212.14	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	12.90	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-106	1.20	22.00	19.50	19.50	426.13	178.42	13.15	3.29
BH-106	1.20	23.50	21.00	21.00	451.35	198.45	13.34	3.34
BH-106	1.20	25.00	22.50	22.50	476.83	218.47	13.69	3.42
BH-106	1.20	26.50	24.00	24.00	502.04	238.50	13.99	3.50
BH-106	1.20	28.00	25.50	25.50	527.26	258.52	14.23	3.56
BH-106	1.20	29.50	27.00	27.00	552.47	278.55	14.44	3.61
BH-106	1.20	30.00	27.50	27.50	560.88	285.22	14.61	3.65

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.05	25	-	10.00	10.88	1.00	-	3.25	4.00	12.75	25.50	5.65	3.16	43.07	46.23	18.49	7.22
2	4.00	5.50	1.50	Granular	17.25	0.05	25	-	10.00	10.88	1.00	-	4.75	5.50	38.44	51.38	5.65	9.52	75.19	87.87	35.15	12.26
3	5.50	7.00	1.50	Granular	17.25	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	64.31	77.25	5.65	15.93	107.15	135.75	54.30	19.09
4	7.00	8.50	1.50	Granular	17.25	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	90.19	103.13	5.65	23.23	168.39	220.22	88.09	27.97
5	8.50	10.00	1.50	Granular	18.30	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	116.85	130.58	5.65	30.09	210.35	292.27	116.91	38.77
6	10.00	11.50	1.50	Granular	18.30	0.11	27	-	13.80	15.50	1.00	-	10.75	11.50	144.30	158.03	5.65	38.59	295.29	415.80	166.32	51.95
7	11.50	13.00	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	12.25	13.00	164.40	170.77	5.65	43.97	308.49	472.97	189.19	66.64
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	177.66	184.56	5.65	49.27	383.04	596.79	238.71	82.81
9	14.50	16.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	191.45	198.35	5.65	53.10	410.92	677.77	271.11	100.05
10	16.00	17.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	205.24	212.14	5.65	58.95	495.67	821.47	328.59	118.93
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	212.14	212.14	5.65	60.94	495.67	882.41	352.96	138.37
12	19.00	20.50	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	212.14	212.14	5.65	63.04	552.53	1002.30	400.92	158.40
13	20.50	22.00	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	212.14	212.14	5.65	63.04	552.53	1065.34	426.13	178.42
14	22.00	23.50	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	212.14	212.14	5.65	63.04	552.53	1128.37	451.35	198.45
15	23.50	25.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	212.14	212.14	5.65	63.04	553.19	1192.07	476.83	218.47
16	25.00	26.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	212.14	212.14	5.65	63.04	553.19	1255.11	502.04	238.50
17	26.50	28.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	212.14	212.14	5.65	63.04	553.19	1318.15	527.26	258.52
18	28.00	29.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	212.14	212.14	5.65	63.04	553.19	1381.19	552.47	278.55
19	29.50	30.00	0.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	212.14	212.14	1.88	21.01	553.19	1402.20	560.88	285.22

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.07E+03	3.97	0.63	2.07	1.85	8.20	7.34	0.152	0.609	13.15	3.29	53.92	24.11	31.55	7.89	129.40	57.86
2	22.50	22	2.96E+07	1.02E-01	3.14E+03	3.95	0.63	2.07	1.85	8.16	7.30	0.150	0.600	13.34	3.34	54.46	24.35	32.03	8.01	130.69	58.45
3	24.00	23	2.96E+07	1.02E-01	3.28E+03	3.91	0.64	2.07	1.85	8.09	7.24	0.146	0.584	13.69	3.42	55.39	24.78	32.86	8.21	132.95	59.47
4	25.50	24	2.96E+07	1.02E-01	3.39E+03	3.89	0.64	2.07	1.85	8.04	7.19	0.143	0.572	13.99	3.50	56.19	25.14	33.56	8.39	134.85	60.34
5	27.00	24	2.96E+07	1.02E-01	3.48E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.562	14.23	3.56	56.84	25.44	34.15	8.54	136.41	61.04
6	28.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.44	3.61	57.39	25.69	34.65	8.66	137.74	61.65
7	30.00	25	2.96E+07	1.02E-01	3.63E+03	3.83	0.65	2.07	1.85	7.92	7.09	0.137	0.548	14.61	3.65	57.84	25.89	35.06	8.76	138.82	62.14

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-107	-
Chainage	11+240	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	187.18	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	12.65	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-107	1.00	22.00	19.50	16.50	291.78	133.65	10.25	2.56
BH-107	1.00	23.50	21.00	18.00	310.32	148.28	10.73	2.68
BH-107	1.00	25.00	22.50	19.50	328.86	162.90	11.13	2.78
BH-107	1.00	26.50	24.00	21.00	347.40	177.53	11.48	2.87
BH-107	1.00	28.00	25.50	22.50	365.94	192.16	11.76	2.94
BH-107	1.00	29.50	27.00	24.00	384.48	206.79	12.00	3.00
BH-107	1.00	30.00	27.50	24.50	390.66	211.66	12.21	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.20	0.02	20	-	0.00	5.39	1.00	-	3.25	4.00	12.15	24.30	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.85	0.02	20	-	0.00	5.39	1.00	-	4.75	5.50	37.69	51.08	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	64.46	77.85	4.71	14.37	104.85	119.21	47.68	11.72
4	7.00	8.50	1.50	Granular	17.75	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	91.16	104.48	4.71	20.32	137.33	172.01	68.80	19.06
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	117.79	131.10	4.71	25.28	144.65	204.61	81.84	27.78
6	10.00	11.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	145.35	159.60	4.71	31.19	174.87	266.02	106.41	38.17
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	166.50	173.39	4.71	37.11	216.89	345.16	138.06	50.21
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	180.29	187.18	4.71	40.18	233.75	402.19	160.87	63.11
9	14.50	16.00	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	187.18	187.18	4.71	43.26	268.55	480.25	192.10	76.87
10	16.00	17.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	187.18	187.18	4.71	43.26	268.55	523.51	209.40	90.63
11	17.50	19.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	187.18	187.18	4.71	44.81	303.69	603.46	241.38	104.83
12	19.00	20.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	187.18	187.18	4.71	44.81	303.69	648.27	259.31	119.02
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	187.18	187.18	4.71	46.35	338.53	729.46	291.78	133.65
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	187.18	187.18	4.71	46.35	338.53	775.81	310.32	148.28
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	187.18	187.18	4.71	46.35	338.53	822.16	328.86	162.90
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	187.18	187.18	4.71	46.35	338.53	868.51	347.40	177.53
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	187.18	187.18	4.71	46.35	338.53	914.86	365.94	192.16
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	187.18	187.18	4.71	46.35	338.53	961.21	384.48	206.79
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	187.18	187.18	1.57	15.45	338.53	976.66	390.66	211.66

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.51E+03	3.57	1.54	1.96	1.82	6.99	6.48	0.195	0.781	10.25	2.56	35.81	16.60	24.59	6.15	85.95	39.83
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.94	17.13	25.76	6.44	88.65	41.11
3	24.00	20	2.96E+07	4.91E-02	2.86E+03	3.48	1.58	1.96	1.81	6.80	6.31	0.180	0.718	11.13	2.78	37.85	17.56	26.72	6.68	90.84	42.15
4	25.50	21	2.96E+07	4.91E-02	2.99E+03	3.44	1.60	1.95	1.81	6.73	6.25	0.174	0.697	11.48	2.87	38.62	17.93	27.54	6.89	92.68	43.02
5	27.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.68	6.20	0.170	0.680	11.76	2.94	39.25	18.23	28.22	7.06	94.20	43.74
6	28.50	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.666	12.00	3.00	39.79	18.48	28.81	7.20	95.50	44.36
7	30.00	23	2.96E+07	4.91E-02	3.30E+03	3.38	1.63	1.95	1.81	6.59	6.13	0.164	0.655	12.21	3.05	40.24	18.70	29.29	7.32	96.58	44.87

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-107	-
Chainage	11+240	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	214.76	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	12.65	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-107	1.20	22.00	19.50	16.50	424.27	175.06	13.31	3.33
BH-107	1.20	23.50	21.00	18.00	449.80	195.30	13.94	3.49
BH-107	1.20	25.00	22.50	19.50	475.32	215.55	14.46	3.62
BH-107	1.20	26.50	24.00	21.00	500.85	235.79	14.91	3.73
BH-107	1.20	28.00	25.50	22.50	526.38	256.03	15.28	3.82
BH-107	1.20	29.50	27.00	24.00	551.90	276.28	15.59	3.90
BH-107	1.20	30.00	27.50	24.50	560.41	283.02	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.20	0.02	20	-	0.00	5.39	1.00	-	3.25	4.00	12.15	24.30	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.85	0.02	20	-	0.00	5.39	1.00	-	4.75	5.50	37.69	51.08	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	64.46	77.85	5.65	17.24	153.77	171.01	68.41	15.91
4	7.00	8.50	1.50	Granular	17.75	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	91.16	104.48	5.65	24.38	200.53	242.15	96.86	25.11
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	117.79	131.10	5.65	30.33	210.69	282.64	113.06	35.98
6	10.00	11.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	145.35	159.60	5.65	37.43	254.38	363.76	145.50	48.84
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	166.50	173.39	5.65	44.53	313.77	467.68	187.07	63.68
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	180.29	187.18	5.65	48.22	338.03	540.16	216.07	79.55
9	14.50	16.00	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	194.08	200.97	5.65	53.83	416.23	672.19	268.87	97.00
10	16.00	17.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	207.87	214.76	5.65	57.65	444.12	757.72	303.09	115.52
11	17.50	19.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	214.76	214.76	5.65	61.69	502.26	877.56	351.02	135.17
12	19.00	20.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	214.76	214.76	5.65	61.69	502.26	939.25	375.70	154.81
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	214.76	214.76	5.65	63.82	559.88	1060.68	424.27	175.06
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	214.76	214.76	5.65	63.82	559.88	1124.49	449.80	195.30
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	214.76	214.76	5.65	63.82	559.88	1188.31	475.32	215.55
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	214.76	214.76	5.65	63.82	559.88	1252.13	500.85	235.79
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	214.76	214.76	5.65	63.82	559.88	1315.94	526.38	256.03
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	214.76	214.76	5.65	63.82	559.88	1379.76	551.90	276.28
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	214.76	214.76	1.88	21.27	559.88	1401.03	560.41	283.02

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.51E+03	4.13	1.33	1.98	1.82	8.17	7.52	0.150	0.601	13.31	3.33	54.37	25.04	31.95	7.99	130.48	60.08
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.08	25.84	33.47	8.37	134.59	62.01
3	24.00	20	2.96E+07	1.02E-01	2.86E+03	4.02	1.37	1.97	1.82	7.95	7.33	0.138	0.553	14.46	3.62	57.46	26.49	34.72	8.68	137.91	63.58
4	25.50	21	2.96E+07	1.02E-01	2.99E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.537	14.91	3.73	58.63	27.04	35.78	8.94	140.71	64.90
5	27.00	22	2.96E+07	1.02E-01	3.11E+03	3.96	1.39	1.97	1.82	7.80	7.20	0.131	0.524	15.28	3.82	59.59	27.49	36.66	9.17	143.02	65.98
6	28.50	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.59	3.90	60.41	27.88	37.42	9.36	144.99	66.91
7	30.00	23	2.96E+07	1.02E-01	3.30E+03	3.91	1.41	1.97	1.82	7.71	7.11	0.126	0.505	15.86	3.96	61.09	28.20	38.06	9.51	146.62	67.68

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-108	-
Chainage	11+329	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	198.89	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-108	1.00	22.00	19.50	16.50	310.32	140.83	11.05	2.76
BH-108	1.00	23.50	21.00	18.00	330.02	156.26	11.45	2.86
BH-108	1.00	25.00	22.50	19.50	349.72	171.70	11.77	2.94
BH-108	1.00	26.50	24.00	21.00	369.42	187.14	12.05	3.01
BH-108	1.00	28.00	25.50	22.50	389.12	202.58	12.28	3.07
BH-108	1.00	29.50	27.00	24.00	408.82	218.02	12.48	3.12
BH-108	1.00	30.00	27.50	24.50	415.39	223.17	12.63	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	62.89	76.28	4.71	14.02	102.92	116.94	46.77	11.62
4	7.00	8.50	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	89.66	103.05	4.71	19.98	135.64	169.64	67.86	18.87
5	8.50	10.00	1.50	Granular	17.85	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	116.44	129.83	4.71	24.99	143.37	202.35	80.94	27.51
6	10.00	11.50	1.50	Granular	17.85	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	143.21	156.60	4.71	30.74	171.21	260.93	104.37	37.77
7	11.50	13.00	1.50	Granular	19.00	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	170.85	185.10	4.71	39.49	271.69	400.90	160.36	50.47
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	192.00	198.89	4.71	44.37	284.99	458.57	183.43	64.55
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	198.89	198.89	4.71	47.61	322.27	543.46	217.39	79.53
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	198.89	198.89	4.71	47.61	322.27	591.07	236.43	94.51
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	198.89	198.89	4.71	49.25	359.24	677.29	270.92	109.95
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	198.89	198.89	4.71	49.25	359.24	726.54	290.62	125.39
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	198.89	198.89	4.71	49.25	359.24	775.80	310.32	140.83
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	198.89	198.89	4.71	49.25	359.24	825.05	330.02	156.26
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	198.89	198.89	4.71	49.25	359.24	874.30	349.72	171.70
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	198.89	198.89	4.71	49.25	359.24	923.55	369.42	187.14
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	198.89	198.89	4.71	49.25	359.24	972.80	389.12	202.58
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	198.89	198.89	4.71	49.25	359.24	1022.05	408.82	218.02
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	198.89	198.89	1.57	16.42	359.24	1038.47	415.39	223.17

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.181	0.724	11.05	2.76	37.65	17.47	26.51	6.63	90.36	41.93
2	22.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.74	6.25	0.175	0.699	11.45	2.86	38.55	17.90	27.47	6.87	92.52	42.95
3	24.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.67	6.20	0.170	0.680	11.77	2.94	39.28	18.24	28.25	7.06	94.28	43.78
4	25.50	23	2.96E+07	4.91E-02	3.23E+03	3.39	1.62	1.95	1.81	6.62	6.15	0.166	0.664	12.05	3.01	39.90	18.53	28.92	7.23	95.76	44.48
5	27.00	23	2.96E+07	4.91E-02	3.33E+03	3.37	1.63	1.95	1.81	6.58	6.11	0.163	0.651	12.28	3.07	40.40	18.77	29.47	7.37	96.97	45.05
6	28.50	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.64	1.95	1.81	6.55	6.08	0.160	0.641	12.48	3.12	40.83	18.98	29.94	7.49	97.99	45.54
7	30.00	24	2.96E+07	4.91E-02	3.48E+03	3.34	1.65	1.95	1.81	6.52	6.06	0.158	0.633	12.63	3.16	41.17	19.14	30.32	7.58	98.81	45.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-108	-
Chainage	11+329	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	227.97	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-108	1.20	22.00	19.50	16.50	451.07	184.39	14.35	3.59
BH-108	1.20	23.50	21.00	18.00	478.16	205.74	14.87	3.72
BH-108	1.20	25.00	22.50	19.50	505.26	227.08	15.29	3.82
BH-108	1.20	26.50	24.00	21.00	532.36	248.42	15.65	3.91
BH-108	1.20	28.00	25.50	22.50	559.45	269.76	15.95	3.99
BH-108	1.20	29.50	27.00	24.00	586.55	291.11	16.21	4.05
BH-108	1.20	30.00	27.50	24.50	595.58	298.22	16.41	4.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.38	24.75	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	16.50	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	37.13	49.50	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	62.89	76.28	5.65	16.82	151.00	167.82	67.13	15.79
4	7.00	8.50	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	89.66	103.05	5.65	23.98	198.12	238.92	95.57	24.88
5	8.50	10.00	1.50	Granular	17.85	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	116.44	129.83	5.65	29.99	208.86	279.64	111.86	35.65
6	10.00	11.50	1.50	Granular	17.85	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	143.21	156.60	5.65	36.88	248.95	356.62	142.65	48.36
7	11.50	13.00	1.50	Granular	19.00	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	170.85	185.10	5.65	47.38	394.62	549.67	219.87	64.00
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	192.00	198.89	5.65	53.25	412.02	620.32	248.13	81.28
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	206.16	213.43	5.65	59.22	499.22	766.74	306.70	100.24
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	220.70	227.97	5.65	63.40	532.44	863.36	345.34	120.36
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	227.97	227.97	5.65	67.74	593.52	992.18	396.87	141.71
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	227.97	227.97	5.65	67.74	593.52	1059.92	423.97	163.05
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	227.97	227.97	5.65	67.74	593.52	1127.66	451.07	184.39
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	227.97	227.97	5.65	67.74	593.52	1195.41	478.16	205.74
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	227.97	227.97	5.65	67.74	593.52	1263.15	505.26	227.08
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	227.97	227.97	5.65	67.74	593.52	1330.89	532.36	248.42
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	227.97	227.97	5.65	67.74	593.52	1398.63	559.45	269.76
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	227.97	227.97	5.65	67.74	593.52	1466.37	586.55	291.11
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	227.97	227.97	1.88	22.58	593.52	1488.95	595.58	298.22

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.82E+03	4.03	1.36	1.98	1.82	7.97	7.34	0.139	0.557	14.35	3.59	57.16	26.35	34.44	8.61	137.19	63.24
2	22.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.135	0.538	14.87	3.72	58.53	26.99	35.69	8.92	140.47	64.78
3	24.00	22	2.96E+07	1.02E-01	3.11E+03	3.95	1.39	1.97	1.82	7.80	7.20	0.131	0.523	15.29	3.82	59.64	27.52	36.70	9.18	143.13	66.04
4	25.50	23	2.96E+07	1.02E-01	3.23E+03	3.93	1.40	1.97	1.82	7.74	7.14	0.128	0.511	15.65	3.91	60.57	27.96	37.57	9.39	145.38	67.09
5	27.00	23	2.96E+07	1.02E-01	3.33E+03	3.90	1.41	1.97	1.82	7.69	7.10	0.125	0.501	15.95	3.99	61.34	28.32	38.29	9.57	147.22	67.96
6	28.50	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.494	16.21	4.05	61.99	28.62	38.90	9.72	148.78	68.70
7	30.00	24	2.96E+07	1.02E-01	3.48E+03	3.87	1.42	1.97	1.82	7.62	7.04	0.122	0.487	16.41	4.10	62.51	28.87	39.39	9.85	150.02	69.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-109	-
Chainage	11+400	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	186.58	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	12.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-109	1.00	22.00	19.50	19.50	297.86	138.20	9.84	2.46
BH-109	1.00	23.50	21.00	21.00	316.34	152.79	10.17	2.54
BH-109	1.00	25.00	22.50	22.50	334.31	167.37	10.45	2.61
BH-109	1.00	26.50	24.00	24.00	352.79	181.96	10.69	2.67
BH-109	1.00	28.00	25.50	25.50	371.27	196.54	10.88	2.72
BH-109	1.00	29.50	27.00	27.00	389.76	211.13	11.05	2.76
BH-109	1.00	30.00	27.50	27.50	395.92	215.99	11.19	2.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.75	25.50	4.71	2.32	17.93	20.24	8.10	5.05
2	4.00	5.50	1.50	Granular	17.00	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	38.25	51.00	4.71	6.95	33.18	42.44	16.97	8.64
3	5.50	7.00	1.50	Granular	17.00	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	63.75	76.50	4.71	14.21	102.73	126.20	50.48	14.27
4	7.00	8.50	1.50	Granular	17.00	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	89.25	102.00	4.71	19.89	133.90	177.26	70.90	21.49
5	8.50	10.00	1.50	Granular	19.00	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	116.25	130.50	4.71	24.95	144.61	212.92	85.17	30.12
6	10.00	11.50	1.50	Granular	19.00	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	144.75	159.00	4.71	31.06	174.24	273.62	109.45	40.47
7	11.50	13.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	165.90	172.79	4.71	38.34	248.34	386.05	154.42	52.85
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	179.69	186.58	4.71	41.53	267.70	446.95	178.78	66.13
9	14.50	16.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	186.58	186.58	4.71	44.66	302.39	526.30	210.52	80.29
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	186.58	186.58	4.71	44.66	302.74	571.31	228.52	94.44
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	186.58	186.58	4.71	46.20	337.47	652.24	260.90	109.03
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	186.58	186.58	4.71	46.20	337.47	698.44	279.38	123.61
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	186.58	186.58	4.71	46.20	337.47	744.64	297.86	138.20
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	186.58	186.58	4.71	46.20	337.47	790.85	316.34	152.79
15	23.50	25.00	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	186.58	186.58	4.71	46.20	336.20	835.78	334.31	167.37
16	25.00	26.50	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	186.58	186.58	4.71	46.20	336.20	881.98	352.79	181.96
17	26.50	28.00	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	186.58	186.58	4.71	46.20	336.20	928.19	371.27	196.54
18	28.00	29.50	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	186.58	186.58	4.71	46.20	336.20	974.39	389.76	211.13
19	29.50	30.00	0.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	186.58	186.58	1.57	15.40	336.20	989.79	395.92	215.99

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.97E+03	3.45	0.72	2.05	1.85	7.09	6.37	0.203	0.813	9.84	2.46	34.85	15.65	23.61	5.90	83.63	37.57
2	22.50	22	2.96E+07	4.91E-02	3.14E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.786	10.17	2.54	35.64	16.02	24.42	6.10	85.54	38.44
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.29	16.31	25.08	6.27	87.09	39.15
4	25.50	24	2.96E+07	4.91E-02	3.39E+03	3.36	0.74	2.05	1.84	6.89	6.20	0.187	0.749	10.69	2.67	36.83	16.56	25.65	6.41	88.39	39.74
5	27.00	24	2.96E+07	4.91E-02	3.49E+03	3.34	0.75	2.05	1.84	6.85	6.16	0.184	0.735	10.88	2.72	37.27	16.76	26.12	6.53	89.46	40.23
6	28.50	25	2.96E+07	4.91E-02	3.57E+03	3.32	0.75	2.05	1.84	6.82	6.13	0.181	0.724	11.05	2.76	37.66	16.94	26.52	6.63	90.38	40.65
7	30.00	26	2.96E+07	4.91E-02	3.64E+03	3.31	0.75	2.05	1.84	6.79	6.11	0.179	0.715	11.19	2.80	37.97	17.08	26.85	6.71	91.13	41.00

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-109	-
Chainage	11+400	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	214.91	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	12.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-109	1.20	22.00	19.50	19.50	432.86	180.97	12.88	3.22
BH-109	1.20	23.50	21.00	21.00	458.41	201.22	13.32	3.33
BH-109	1.20	25.00	22.50	22.50	483.07	221.48	13.68	3.42
BH-109	1.20	26.50	24.00	24.00	508.62	241.73	13.99	3.50
BH-109	1.20	28.00	25.50	25.50	534.16	261.99	14.24	3.56
BH-109	1.20	29.50	27.00	27.00	559.71	282.25	14.46	3.62
BH-109	1.20	30.00	27.50	27.50	568.22	289.00	14.64	3.66

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	12.75	25.50	5.65	2.78	26.59	29.37	11.75	7.11
2	4.00	5.50	1.50	Granular	17.00	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	38.25	51.00	5.65	8.34	48.54	59.66	23.86	11.82
3	5.50	7.00	1.50	Granular	17.00	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	63.75	76.50	5.65	17.05	150.60	178.76	71.50	18.97
4	7.00	8.50	1.50	Granular	17.00	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	89.25	102.00	5.65	23.87	195.47	247.51	99.00	28.03
5	8.50	10.00	1.50	Granular	19.00	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	116.25	130.50	5.65	29.94	210.80	292.77	117.11	38.79
6	10.00	11.50	1.50	Granular	19.00	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	144.75	159.00	5.65	37.28	253.48	372.72	149.09	51.60
7	11.50	13.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	165.90	172.79	5.65	46.01	359.24	524.50	209.80	66.86
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	179.69	186.58	5.65	49.83	387.13	602.22	240.89	83.18
9	14.50	16.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	193.48	200.37	5.65	55.58	468.79	739.46	295.78	101.12
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	207.64	214.91	5.65	59.64	502.61	832.92	333.17	120.20
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	214.91	214.91	5.65	63.86	560.26	954.43	381.77	140.45
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	214.91	214.91	5.65	63.86	560.26	1018.29	407.32	160.71
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	214.91	214.91	5.65	63.86	560.26	1082.15	432.86	180.97
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	214.91	214.91	5.65	63.86	560.26	1146.02	458.41	201.22
15	23.50	25.00	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	214.91	214.91	5.65	63.86	558.07	1207.69	483.07	221.48
16	25.00	26.50	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	214.91	214.91	5.65	63.86	558.07	1271.55	508.62	241.73
17	26.50	28.00	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	214.91	214.91	5.65	63.86	558.07	1335.41	534.16	261.99
18	28.00	29.50	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	214.91	214.91	5.65	63.86	558.07	1399.27	559.71	282.25
19	29.50	30.00	0.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	214.91	214.91	1.88	21.29	558.07	1420.56	568.22	289.00

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.97E+03	3.99	0.63	2.07	1.85	8.26	7.38	0.155	0.621	12.88	3.22	53.19	23.78	30.91	7.73	127.65	57.07
2	22.50	22	2.96E+07	1.02E-01	3.14E+03	3.95	0.63	2.07	1.85	8.17	7.30	0.150	0.601	13.32	3.33	54.39	24.33	31.97	7.99	130.55	58.38
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.45
4	25.50	24	2.96E+07	1.02E-01	3.39E+03	3.89	0.64	2.07	1.85	8.03	7.19	0.143	0.572	13.99	3.50	56.20	25.14	33.57	8.39	134.87	60.34
5	27.00	24	2.96E+07	1.02E-01	3.49E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.140	0.562	14.24	3.56	56.87	25.45	34.18	8.55	136.50	61.08
6	28.50	25	2.96E+07	1.02E-01	3.57E+03	3.85	0.65	2.07	1.85	7.95	7.11	0.138	0.553	14.46	3.62	57.45	25.72	34.71	8.68	137.89	61.72
7	30.00	26	2.96E+07	1.02E-01	3.64E+03	3.83	0.65	2.07	1.85	7.91	7.08	0.137	0.546	14.64	3.66	57.93	25.93	35.14	8.78	139.03	62.24

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-101	-
Chainage	10+631	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	101.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-101	1.00	22.00	19.50	18.00	159.10	83.29	11.08	2.77
BH-101	1.00	23.50	21.00	19.50	169.13	91.97	11.41	2.85
BH-101	1.00	25.00	22.50	21.00	179.17	100.64	11.68	2.92
BH-101	1.00	26.50	24.00	22.50	189.21	109.32	11.91	2.98
BH-101	1.00	28.00	25.50	24.00	199.24	117.99	12.09	3.02
BH-101	1.00	29.50	27.00	25.50	209.28	126.67	12.25	3.06
BH-101	1.00	30.00	27.50	26.00	212.62	129.56	12.38	3.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	4.75	5.50	16.19	21.58	4.71	3.47	25.81	29.29	11.71	7.02
3	5.50	7.00	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	26.98	32.37	4.71	5.79	37.03	46.30	18.52	10.29
4	7.00	8.50	1.50	Granular	9.19	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	39.27	46.16	4.71	8.43	52.31	70.00	28.00	14.30
5	8.50	10.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	9.25	10.00	53.06	59.95	4.71	12.26	89.88	119.83	47.93	19.38
6	10.00	11.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	10.75	11.50	66.85	73.74	4.71	15.45	109.24	154.64	61.86	25.36
7	11.50	13.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	80.64	87.53	4.71	19.30	145.25	209.95	83.98	32.41
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	94.43	101.32	4.71	22.60	167.13	254.43	101.77	40.39
9	14.50	16.00	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	101.32	101.32	4.71	24.25	167.47	279.03	111.61	48.83
10	16.00	17.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	101.32	101.32	4.71	24.25	167.47	303.28	121.31	57.27
11	17.50	19.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	101.32	101.32	4.71	25.09	186.66	347.56	139.03	65.94
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	101.32	101.32	4.71	25.09	186.66	372.65	149.06	74.62
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	101.32	101.32	4.71	25.09	186.66	397.74	159.10	83.29
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	101.32	101.32	4.71	25.09	186.66	422.83	169.13	91.97
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	101.32	101.32	4.71	25.09	186.66	447.92	179.17	100.64
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	101.32	101.32	4.71	25.09	186.66	473.01	189.21	109.32
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	101.32	101.32	4.71	25.09	186.66	498.10	199.24	117.99
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	101.32	101.32	4.71	25.09	186.66	523.19	209.28	126.67
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	101.32	101.32	1.57	8.36	186.66	531.56	212.62	129.56

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.14E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.180	0.722	11.08	2.77	37.73	17.28	26.60	6.65	90.56	41.47
2	22.50	23	2.96E+07	4.91E-02	3.28E+03	3.38	1.18	1.99	1.83	6.74	6.18	0.175	0.701	11.41	2.85	38.47	17.62	27.38	6.85	92.33	42.29
3	24.00	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.685	11.68	2.92	39.07	17.90	28.03	7.01	93.77	42.97
4	25.50	25	2.96E+07	4.91E-02	3.51E+03	3.34	1.20	1.99	1.83	6.65	6.09	0.168	0.672	11.91	2.98	39.58	18.14	28.57	7.14	94.98	43.53
5	27.00	25	2.96E+07	4.91E-02	3.60E+03	3.32	1.20	1.99	1.83	6.61	6.06	0.165	0.662	12.09	3.02	39.99	18.33	29.02	7.26	95.98	44.00
6	28.50	26	2.96E+07	4.91E-02	3.67E+03	3.31	1.21	1.99	1.83	6.59	6.04	0.163	0.653	12.25	3.06	40.34	18.50	29.40	7.35	96.82	44.39
7	30.00	26	2.96E+07	4.91E-02	3.73E+03	3.30	1.21	1.99	1.83	6.56	6.02	0.162	0.646	12.38	3.10	40.62	18.63	29.71	7.43	97.50	44.71

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-101	-
Chainage	10+631	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	130.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-101	1.20	22.00	19.50	18.00	253.03	115.35	14.42	3.61
BH-101	1.20	23.50	21.00	19.50	268.53	128.58	14.85	3.71
BH-101	1.20	25.00	22.50	21.00	284.03	141.80	15.19	3.80
BH-101	1.20	26.50	24.00	22.50	299.53	155.03	15.49	3.87
BH-101	1.20	28.00	25.50	24.00	315.03	168.25	15.73	3.93
BH-101	1.20	29.50	27.00	25.50	330.53	181.48	15.94	3.98
BH-101	1.20	30.00	27.50	26.00	335.70	185.89	16.11	4.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	4.75	5.50	16.19	21.58	5.65	4.17	38.14	42.31	16.92	9.88
3	5.50	7.00	1.50	Granular	7.19	0.03	26	-	11.90	13.19	1.00	-	6.25	7.00	26.98	32.37	5.65	6.95	54.30	65.41	26.17	14.20
4	7.00	8.50	1.50	Granular	9.19	0.03	26	-	11.90	13.19	1.00	-	7.75	8.50	39.27	46.16	5.65	10.11	76.57	97.80	39.12	19.40
5	8.50	10.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	9.25	10.00	53.06	59.95	5.65	14.71	131.06	167.00	66.80	25.90
6	10.00	11.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	10.75	11.50	66.85	73.74	5.65	18.54	158.95	213.43	85.37	33.46
7	11.50	13.00	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	12.25	13.00	80.64	87.53	5.65	23.16	210.99	288.64	115.45	42.32
8	13.00	14.50	1.50	Granular	9.19	0.04	29	-	17.60	20.13	1.00	-	13.75	14.50	94.43	101.32	5.65	27.12	242.50	347.26	138.91	52.29
9	14.50	16.00	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	15.25	16.00	108.59	115.86	5.65	31.19	276.31	412.27	164.91	63.40
10	16.00	17.50	1.50	Granular	9.69	0.05	29	-	17.60	20.13	1.00	-	16.75	17.50	123.13	130.40	5.65	35.37	309.53	480.86	192.34	75.68
11	17.50	19.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	18.25	19.00	130.40	130.40	5.65	38.75	345.01	555.08	222.03	88.91
12	19.00	20.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	19.75	20.50	130.40	130.40	5.65	38.75	345.01	593.83	237.53	102.13
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	130.40	130.40	5.65	38.75	345.01	632.58	253.03	115.35
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	130.40	130.40	5.65	38.75	345.01	671.33	268.53	128.58
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	130.40	130.40	5.65	38.75	345.01	710.08	284.03	141.80
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	130.40	130.40	5.65	38.75	345.01	748.83	299.53	155.03
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	130.40	130.40	5.65	38.75	345.01	787.58	315.03	168.25
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	130.40	130.40	5.65	38.75	345.01	826.33	330.53	181.48
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	130.40	130.40	1.88	12.92	345.01	839.24	335.70	185.89

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.14E+03	3.95	1.01	2.01	1.83	7.95	7.24	0.139	0.555	14.42	3.61	57.35	26.10	34.61	8.65	137.64	62.63
2	22.50	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.02	2.01	1.83	7.88	7.17	0.135	0.539	14.85	3.71	58.47	26.62	35.63	8.91	140.33	63.88
3	24.00	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.82	7.12	0.132	0.527	15.19	3.80	59.38	27.04	36.46	9.12	142.51	64.89
4	25.50	25	2.96E+07	1.02E-01	3.51E+03	3.86	1.04	2.01	1.83	7.77	7.07	0.129	0.517	15.49	3.87	60.14	27.39	37.17	9.29	144.35	65.75
5	27.00	25	2.96E+07	1.02E-01	3.60E+03	3.84	1.04	2.01	1.83	7.73	7.04	0.127	0.509	15.73	3.93	60.77	27.69	37.75	9.44	145.85	66.44
6	28.50	26	2.96E+07	1.02E-01	3.67E+03	3.83	1.05	2.01	1.83	7.69	7.01	0.125	0.502	15.94	3.98	61.30	27.93	38.25	9.56	147.13	67.04
7	30.00	26	2.96E+07	1.02E-01	3.73E+03	3.81	1.05	2.01	1.83	7.67	6.99	0.124	0.497	16.11	4.03	61.73	28.13	38.65	9.66	148.15	67.51

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-102	-
Chainage	10+709	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	94.95	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-102	1.00	22.00	19.50	13.50	139.08	72.44	10.66	2.66
BH-102	1.00	23.50	21.00	15.00	148.48	80.67	11.22	2.80
BH-102	1.00	25.00	22.50	16.50	157.89	88.90	11.68	2.92
BH-102	1.00	26.50	24.00	18.00	167.29	97.13	12.07	3.02
BH-102	1.00	28.00	25.50	19.50	176.33	105.37	12.39	3.10
BH-102	1.00	29.50	27.00	21.00	185.73	113.60	12.67	3.17
BH-102	1.00	30.00	27.50	21.50	188.86	116.34	12.90	3.23

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.44	0.00	25	-	10.00	10.88	1.00	-	6.25	7.00	25.66	31.25	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.44	0.00	25	-	10.00	10.88	1.00	-	7.75	8.50	36.83	42.41	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	7.44	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	47.99	53.58	4.71	10.30	59.20	69.50	27.80	13.88
6	10.00	11.50	1.50	Granular	9.19	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	60.47	67.37	4.71	12.98	74.36	97.64	39.05	19.16
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	74.26	81.16	4.71	16.55	104.18	144.00	57.60	25.45
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	88.05	94.95	4.71	19.62	121.03	180.48	72.19	32.59
9	14.50	16.00	1.50	Granular	8.49	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	94.95	94.95	4.71	21.94	138.59	219.98	87.99	40.38
10	16.00	17.50	1.50	Granular	8.49	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	94.95	94.95	4.71	21.94	138.59	241.93	96.77	48.18
11	17.50	19.00	1.50	Granular	8.49	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	94.95	94.95	4.71	22.73	156.53	282.59	113.04	56.19
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	94.95	94.95	4.71	22.73	157.36	306.15	122.46	64.20
13	20.50	22.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	94.95	94.95	4.71	23.51	175.39	347.69	139.08	72.44
14	22.00	23.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	94.95	94.95	4.71	23.51	175.39	371.20	148.48	80.67
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	94.95	94.95	4.71	23.51	175.39	394.71	157.89	88.90
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	94.95	94.95	4.71	23.51	175.39	418.22	167.29	97.13
17	26.50	28.00	1.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	94.95	94.95	4.71	23.51	174.46	440.81	176.33	105.37
18	28.00	29.50	1.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	94.95	94.95	4.71	23.51	174.46	464.32	185.73	113.60
19	29.50	30.00	0.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	94.95	94.95	1.57	7.84	174.46	472.16	188.86	116.34

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	4.91E-02	2.34E+03	3.62	2.35	1.91	1.80	6.90	6.50	0.188	0.751	10.66	2.66	36.76	17.33	25.57	6.39	88.22	41.58
2	22.50	18	2.96E+07	4.91E-02	2.54E+03	3.56	2.39	1.90	1.80	6.78	6.40	0.178	0.713	11.22	2.80	38.03	17.94	26.92	6.73	91.28	43.05
3	24.00	19	2.96E+07	4.91E-02	2.71E+03	3.52	2.42	1.90	1.80	6.69	6.31	0.171	0.685	11.68	2.92	39.07	18.43	28.02	7.01	93.76	44.24
4	25.50	20	2.96E+07	4.91E-02	2.85E+03	3.48	2.44	1.90	1.80	6.62	6.25	0.166	0.663	12.07	3.02	39.93	18.85	28.96	7.24	95.84	45.23
5	27.00	21	2.96E+07	4.91E-02	2.97E+03	3.45	2.46	1.90	1.80	6.56	6.19	0.161	0.646	12.39	3.10	40.65	19.19	29.74	7.44	97.56	46.06
6	28.50	22	2.96E+07	4.91E-02	3.08E+03	3.43	2.48	1.90	1.80	6.51	6.15	0.158	0.631	12.67	3.17	41.26	19.48	30.41	7.60	99.02	46.76
7	30.00	22	2.96E+07	4.91E-02	3.17E+03	3.41	2.50	1.90	1.80	6.47	6.11	0.155	0.620	12.90	3.23	41.76	19.72	30.97	7.74	100.23	47.34

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-102	-
Chainage	10+709	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	120.43	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-102	1.20	22.00	19.50	13.50	222.26	100.93	13.90	3.48
BH-102	1.20	23.50	21.00	15.00	236.57	113.32	14.64	3.66
BH-102	1.20	25.00	22.50	16.50	250.88	125.72	15.25	3.81
BH-102	1.20	26.50	24.00	18.00	265.20	138.11	15.76	3.94
BH-102	1.20	28.00	25.50	19.50	278.88	150.50	16.19	4.05
BH-102	1.20	29.50	27.00	21.00	293.19	162.90	16.56	4.14
BH-102	1.20	30.00	27.50	21.50	297.96	167.03	16.87	4.22

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.44	0.00	25	-	10.00	10.88	1.00	-	6.25	7.00	25.66	31.25	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.44	0.00	25	-	10.00	10.88	1.00	-	7.75	8.50	36.83	42.41	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	7.44	0.02	26	-	11.90	13.19	1.00	-	9.25	10.00	47.99	53.58	5.65	12.36	86.25	98.61	39.45	19.29
6	10.00	11.50	1.50	Granular	9.19	0.02	26	-	11.90	13.19	1.00	-	10.75	11.50	60.47	67.37	5.65	15.57	108.32	136.25	54.50	26.03
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	74.26	81.16	5.65	19.86	151.45	199.25	79.70	33.97
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	88.05	94.95	5.65	23.55	175.72	247.06	98.83	42.93
9	14.50	16.00	1.50	Granular	8.49	0.05	28	-	15.70	17.82	1.00	-	15.25	16.00	101.32	107.69	5.65	28.10	226.84	326.28	130.51	53.18
10	16.00	17.50	1.50	Granular	8.49	0.05	28	-	15.70	17.82	1.00	-	16.75	17.50	114.06	120.43	5.65	31.63	252.60	383.68	153.47	64.41
11	17.50	19.00	1.50	Granular	8.49	0.03	29	-	17.60	20.13	1.00	-	18.25	19.00	120.43	120.43	5.65	34.59	285.31	450.97	180.39	76.47
12	19.00	20.50	1.50	Granular	9.69	0.03	29	-	17.60	20.13	1.00	-	19.75	20.50	120.43	120.43	5.65	34.59	286.74	487.00	194.80	88.53
13	20.50	22.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	21.25	22.00	120.43	120.43	5.65	35.78	319.60	555.64	222.26	100.93
14	22.00	23.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	22.75	23.50	120.43	120.43	5.65	35.78	319.60	591.43	236.57	113.32
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	120.43	120.43	5.65	35.78	319.60	627.21	250.88	125.72
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	120.43	120.43	5.65	35.78	319.60	663.00	265.20	138.11
17	26.50	28.00	1.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	120.43	120.43	5.65	35.78	318.01	697.19	278.88	150.50
18	28.00	29.50	1.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	120.43	120.43	5.65	35.78	318.01	732.97	293.19	162.90
19	29.50	30.00	0.50	Granular	8.49	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	120.43	120.43	1.88	11.93	318.01	744.90	297.96	167.03

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	17	2.96E+07	1.02E-01	2.34E+03	4.19	2.03	1.92	1.80	8.05	7.55	0.144	0.575	13.90	3.48	55.97	26.24	33.37	8.34	134.32	62.99
2	22.50	18	2.96E+07	1.02E-01	2.54E+03	4.12	2.06	1.92	1.80	7.91	7.43	0.137	0.546	14.64	3.66	57.93	27.18	35.14	8.78	139.03	65.24
3	24.00	19	2.96E+07	1.02E-01	2.71E+03	4.07	2.09	1.92	1.80	7.81	7.33	0.131	0.525	15.25	3.81	59.52	27.94	36.59	9.15	142.84	67.06
4	25.50	20	2.96E+07	1.02E-01	2.85E+03	4.03	2.11	1.92	1.80	7.72	7.25	0.127	0.508	15.76	3.94	60.85	28.58	37.83	9.46	146.03	68.58
5	27.00	21	2.96E+07	1.02E-01	2.97E+03	3.99	2.13	1.92	1.80	7.65	7.19	0.124	0.494	16.19	4.05	61.95	29.10	38.85	9.71	148.67	69.84
6	28.50	22	2.96E+07	1.02E-01	3.08E+03	3.96	2.14	1.92	1.80	7.60	7.14	0.121	0.483	16.56	4.14	62.88	29.55	39.74	9.94	150.92	70.92
7	30.00	22	2.96E+07	1.02E-01	3.17E+03	3.94	2.16	1.92	1.80	7.55	7.10	0.119	0.474	16.87	4.22	63.66	29.92	40.48	10.12	152.78	71.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-103	-
Chainage	10+821	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	96.22	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-103	1.00	22.00	19.50	18.00	149.11	78.83	10.79	2.70
BH-103	1.00	23.50	21.00	19.50	158.64	87.15	11.14	2.79
BH-103	1.00	25.00	22.50	21.00	168.17	95.47	11.43	2.86
BH-103	1.00	26.50	24.00	22.50	177.70	103.79	11.68	2.92
BH-103	1.00	28.00	25.50	24.00	187.24	112.11	11.88	2.97
BH-103	1.00	29.50	27.00	25.50	196.77	120.43	12.05	3.01
BH-103	1.00	30.00	27.50	26.00	199.94	123.21	12.20	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	4.71	2.73	13.06	15.80	6.32	6.81
3	5.50	7.00	1.50	Granular	8.04	0.03	22	-	4.00	7.59	1.00	-	6.25	7.00	26.11	32.15	4.71	4.74	20.49	27.97	11.19	9.79
4	7.00	8.50	1.50	Granular	8.04	0.03	22	-	4.00	7.59	1.00	-	7.75	8.50	38.18	44.21	4.71	6.93	27.70	42.11	16.85	13.38
5	8.50	10.00	1.50	Granular	8.49	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	50.58	56.95	4.71	11.69	85.23	111.33	44.53	18.30
6	10.00	11.50	1.50	Granular	8.49	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	63.32	69.69	4.71	14.63	103.12	143.86	57.54	24.05
7	11.50	13.00	1.50	Granular	8.49	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	76.06	82.43	4.71	16.95	105.35	163.04	65.22	30.45
8	13.00	14.50	1.50	Granular	9.19	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	89.33	96.22	4.71	19.91	122.59	200.18	80.07	37.67
9	14.50	16.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	96.22	96.22	4.71	23.03	159.03	259.66	103.86	45.77
10	16.00	17.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	96.22	96.22	4.71	23.03	159.03	282.69	113.08	53.87
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	96.22	96.22	4.71	23.83	177.64	325.13	130.05	62.19
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	96.22	96.22	4.71	23.83	177.64	348.95	139.58	70.51
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	96.22	96.22	4.71	23.83	177.64	372.78	149.11	78.83
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	96.22	96.22	4.71	23.83	177.64	396.61	158.64	87.15
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	96.22	96.22	4.71	23.83	177.64	420.43	168.17	95.47
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	96.22	96.22	4.71	23.83	177.64	444.26	177.70	103.79
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	96.22	96.22	4.71	23.83	177.64	468.09	187.24	112.11
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	96.22	96.22	4.71	23.83	177.64	491.91	196.77	120.43
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	96.22	96.22	1.57	7.94	177.64	499.86	199.94	123.21

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	3.01E+03	3.44	1.16	2.00	1.83	6.87	6.29	0.185	0.741	10.79	2.70	37.06	16.97	25.90	6.47	88.96	40.72
2	22.50	22	2.96E+07	4.91E-02	3.16E+03	3.41	1.17	2.00	1.83	6.80	6.22	0.179	0.718	11.14	2.79	37.87	17.34	26.74	6.69	90.88	41.62
3	24.00	23	2.96E+07	4.91E-02	3.29E+03	3.38	1.18	1.99	1.83	6.74	6.17	0.175	0.700	11.43	2.86	38.52	17.65	27.44	6.86	92.45	42.35
4	25.50	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.685	11.68	2.92	39.07	17.90	28.03	7.01	93.77	42.97
5	27.00	25	2.96E+07	4.91E-02	3.50E+03	3.34	1.20	1.99	1.83	6.65	6.10	0.168	0.673	11.88	2.97	39.52	18.11	28.51	7.13	94.85	43.47
6	28.50	25	2.96E+07	4.91E-02	3.58E+03	3.32	1.20	1.99	1.83	6.62	6.07	0.166	0.664	12.05	3.01	39.91	18.29	28.93	7.23	95.77	43.90
7	30.00	26	2.96E+07	4.91E-02	3.64E+03	3.31	1.21	1.99	1.83	6.60	6.05	0.164	0.656	12.20	3.05	40.22	18.44	29.27	7.32	96.52	44.25

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-103	-
Chainage	10+821	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	123.80	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-103	1.20	22.00	19.50	18.00	237.95	109.50	14.04	3.51
BH-103	1.20	23.50	21.00	19.50	252.66	122.18	14.50	3.62
BH-103	1.20	25.00	22.50	21.00	267.38	134.85	14.87	3.72
BH-103	1.20	26.50	24.00	22.50	282.09	147.53	15.19	3.80
BH-103	1.20	28.00	25.50	24.00	296.81	160.21	15.46	3.86
BH-103	1.20	29.50	27.00	25.50	311.52	172.88	15.68	3.92
BH-103	1.20	30.00	27.50	26.00	316.43	177.11	15.87	3.97

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	5.65	3.28	19.11	22.39	8.96	9.63
3	5.50	7.00	1.50	Granular	8.04	0.03	22	-	4.00	7.59	1.00	-	6.25	7.00	26.11	32.15	5.65	5.69	29.87	38.84	15.54	13.60
4	7.00	8.50	1.50	Granular	8.04	0.03	22	-	4.00	7.59	1.00	-	7.75	8.50	38.18	44.21	5.65	8.32	40.26	57.55	23.02	18.30
5	8.50	10.00	1.50	Granular	8.49	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	50.58	56.95	5.65	14.03	124.25	155.57	62.23	24.60
6	10.00	11.50	1.50	Granular	8.49	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	63.32	69.69	5.65	17.56	150.01	198.89	79.56	31.90
7	11.50	13.00	1.50	Granular	8.49	0.08	27	-	13.80	15.50	1.00	-	12.25	13.00	76.06	82.43	5.65	20.34	153.04	222.26	88.91	39.97
8	13.00	14.50	1.50	Granular	9.19	0.08	27	-	13.80	15.50	1.00	-	13.75	14.50	89.33	96.22	5.65	23.89	177.97	271.08	108.43	49.03
9	14.50	16.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	15.25	16.00	103.12	110.01	5.65	29.62	262.35	385.08	154.03	59.70
10	16.00	17.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	16.75	17.50	116.91	123.80	5.65	33.58	293.86	450.17	180.07	71.48
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	123.80	123.80	5.65	36.79	328.20	521.30	208.52	84.15
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	123.80	123.80	5.65	36.79	328.20	558.08	223.23	96.83
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	123.80	123.80	5.65	36.79	328.20	594.87	237.95	109.50
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	123.80	123.80	5.65	36.79	328.20	631.66	252.66	122.18
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	123.80	123.80	5.65	36.79	328.20	668.45	267.38	134.85
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	123.80	123.80	5.65	36.79	328.20	705.24	282.09	147.53
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	123.80	123.80	5.65	36.79	328.20	742.02	296.81	160.21
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	123.80	123.80	5.65	36.79	328.20	778.81	311.52	172.88
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	123.80	123.80	1.88	12.26	328.20	791.07	316.43	177.11

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	3.01E+03	3.98	1.00	2.02	1.83	8.02	7.30	0.142	0.570	14.04	3.51	56.34	25.63	33.70	8.43	135.21	61.51
2	22.50	22	2.96E+07	1.02E-01	3.16E+03	3.94	1.01	2.01	1.83	7.94	7.23	0.138	0.552	14.50	3.62	57.56	26.19	34.80	8.70	138.13	62.86
3	24.00	23	2.96E+07	1.02E-01	3.29E+03	3.91	1.02	2.01	1.83	7.87	7.17	0.134	0.538	14.87	3.72	58.54	26.65	35.70	8.92	140.50	63.96
4	25.50	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.82	7.12	0.132	0.527	15.19	3.80	59.38	27.04	36.46	9.12	142.50	64.89
5	27.00	25	2.96E+07	1.02E-01	3.50E+03	3.86	1.04	2.01	1.83	7.77	7.08	0.129	0.518	15.46	3.86	60.06	27.36	37.10	9.27	144.15	65.65
6	28.50	25	2.96E+07	1.02E-01	3.58E+03	3.85	1.04	2.01	1.83	7.73	7.05	0.128	0.510	15.68	3.92	60.64	27.63	37.64	9.41	145.55	66.30
7	30.00	26	2.96E+07	1.02E-01	3.64E+03	3.83	1.04	2.01	1.83	7.70	7.02	0.126	0.504	15.87	3.97	61.12	27.85	38.08	9.52	146.68	66.83

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-104	-
Chainage	10+946	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	93.90	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-104	1.00	22.00	19.50	16.50	142.24	75.17	10.34	2.58
BH-104	1.00	23.50	21.00	18.00	151.54	83.33	10.80	2.70
BH-104	1.00	25.00	22.50	19.50	160.84	91.49	11.18	2.79
BH-104	1.00	26.50	24.00	21.00	170.14	99.65	11.50	2.87
BH-104	1.00	28.00	25.50	22.50	179.44	107.81	11.77	2.94
BH-104	1.00	29.50	27.00	24.00	188.74	115.97	11.99	3.00
BH-104	1.00	30.00	27.50	24.50	191.84	118.69	12.18	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.44	0.03	22	-	4.00	7.59	1.00	-	6.25	7.00	25.66	31.25	4.71	4.66	19.86	24.52	9.81	9.00
4	7.00	8.50	1.50	Granular	7.44	0.03	22	-	4.00	7.59	1.00	-	7.75	8.50	36.83	42.41	4.71	6.69	26.53	37.88	15.15	12.52
5	8.50	10.00	1.50	Granular	7.44	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	47.99	53.58	4.71	10.30	59.20	80.85	32.34	17.06
6	10.00	11.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	60.47	67.37	4.71	12.98	74.36	108.98	43.59	22.34
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	74.26	81.16	4.71	17.16	119.65	171.44	68.58	28.79
8	13.00	14.50	1.50	Granular	8.49	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	87.53	93.90	4.71	20.23	137.11	209.13	83.65	36.11
9	14.50	16.00	1.50	Granular	8.49	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	93.90	93.90	4.71	20.93	119.37	212.31	84.92	43.62
10	16.00	17.50	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	93.90	93.90	4.71	20.93	120.02	233.89	93.55	51.13
11	17.50	19.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	93.90	93.90	4.71	22.48	155.69	292.04	116.81	59.07
12	19.00	20.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	93.90	93.90	4.71	22.48	155.69	314.51	125.81	67.01
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	93.90	93.90	4.71	23.25	173.53	355.60	142.24	75.17
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	93.90	93.90	4.71	23.25	173.53	378.85	151.54	83.33
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	93.90	93.90	4.71	23.25	173.53	402.10	160.84	91.49
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	93.90	93.90	4.71	23.25	173.53	425.35	170.14	99.65
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	93.90	93.90	4.71	23.25	173.53	448.61	179.44	107.81
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	93.90	93.90	4.71	23.25	173.53	471.86	188.74	115.97
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	93.90	93.90	1.57	7.75	173.53	479.61	191.84	118.69

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.54E+03	3.56	1.55	1.96	1.82	6.97	6.46	0.193	0.774	10.34	2.58	36.02	16.70	24.81	6.20	86.46	40.08
2	22.50	19	2.96E+07	4.91E-02	2.72E+03	3.51	1.57	1.96	1.81	6.87	6.37	0.185	0.741	10.80	2.70	37.08	17.20	25.92	6.48	89.00	41.28
3	24.00	20	2.96E+07	4.91E-02	2.87E+03	3.47	1.58	1.95	1.81	6.79	6.30	0.179	0.716	11.18	2.79	37.95	17.61	26.82	6.71	91.07	42.26
4	25.50	21	2.96E+07	4.91E-02	3.00E+03	3.44	1.60	1.95	1.81	6.73	6.24	0.174	0.696	11.50	2.87	38.67	17.95	27.60	6.90	92.81	43.08
5	27.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.67	6.20	0.170	0.680	11.77	2.94	39.27	18.23	28.24	7.06	94.24	43.76
6	28.50	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.667	11.99	3.00	39.77	18.47	28.79	7.20	95.45	44.34
7	30.00	23	2.96E+07	4.91E-02	3.28E+03	3.38	1.63	1.95	1.81	6.60	6.13	0.164	0.657	12.18	3.05	40.18	18.67	29.23	7.31	96.44	44.81

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-104	-
Chainage	10+946	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	121.18	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-104	1.20	22.00	19.50	16.50	228.33	104.64	13.43	3.36
BH-104	1.20	23.50	21.00	18.00	242.74	117.10	14.03	3.51
BH-104	1.20	25.00	22.50	19.50	257.14	129.56	14.52	3.63
BH-104	1.20	26.50	24.00	21.00	271.54	142.02	14.94	3.73
BH-104	1.20	28.00	25.50	22.50	285.94	154.47	15.28	3.82
BH-104	1.20	29.50	27.00	24.00	300.35	166.93	15.58	3.90
BH-104	1.20	30.00	27.50	24.50	305.15	171.08	15.82	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.44	0.03	22	-	4.00	7.59	1.00	-	6.25	7.00	25.66	31.25	5.65	5.59	28.93	34.52	13.81	12.65
4	7.00	8.50	1.50	Granular	7.44	0.03	22	-	4.00	7.59	1.00	-	7.75	8.50	36.83	42.41	5.65	8.03	38.54	52.16	20.86	17.27
5	8.50	10.00	1.50	Granular	7.44	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	47.99	53.58	5.65	12.36	86.25	112.23	44.89	23.11
6	10.00	11.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	60.47	67.37	5.65	15.57	108.32	149.87	59.95	29.84
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	74.26	81.16	5.65	20.60	173.94	236.09	94.43	37.98
8	13.00	14.50	1.50	Granular	8.49	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	87.53	93.90	5.65	24.27	198.96	285.38	114.15	47.16
9	14.50	16.00	1.50	Granular	8.49	0.08	27	-	13.80	15.50	1.00	-	15.25	16.00	100.27	106.64	5.65	26.81	195.64	308.87	123.55	57.04
10	16.00	17.50	1.50	Granular	9.69	0.08	27	-	13.80	15.50	1.00	-	16.75	17.50	113.91	121.18	5.65	30.46	222.35	366.05	146.42	67.94
11	17.50	19.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	121.18	121.18	5.65	34.81	288.46	466.96	186.79	80.07
12	19.00	20.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	121.18	121.18	5.65	34.81	288.46	501.77	200.71	92.19
13	20.50	22.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	121.18	121.18	5.65	36.01	321.51	570.83	228.33	104.64
14	22.00	23.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	121.18	121.18	5.65	36.01	321.51	606.84	242.74	117.10
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	121.18	121.18	5.65	36.01	321.51	642.85	257.14	129.56
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	121.18	121.18	5.65	36.01	321.51	678.85	271.54	142.02
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	121.18	121.18	5.65	36.01	321.51	714.86	285.94	154.47
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	121.18	121.18	5.65	36.01	321.51	750.87	300.35	166.93
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	121.18	121.18	1.88	12.00	321.51	762.87	305.15	171.08

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.54E+03	4.12	1.34	1.98	1.82	8.14	7.50	0.149	0.596	13.43	3.36	54.69	25.19	32.24	8.06	131.26	60.45
2	22.50	19	2.96E+07	1.02E-01	2.72E+03	4.06	1.35	1.98	1.82	8.03	7.40	0.143	0.570	14.03	3.51	56.30	25.94	33.67	8.42	135.13	62.27
3	24.00	20	2.96E+07	1.02E-01	2.87E+03	4.02	1.37	1.97	1.82	7.94	7.32	0.138	0.551	14.52	3.63	57.61	26.56	34.85	8.71	138.26	63.74
4	25.50	21	2.96E+07	1.02E-01	3.00E+03	3.98	1.38	1.97	1.82	7.86	7.25	0.134	0.536	14.94	3.73	58.71	27.08	35.85	8.96	140.90	64.99
5	27.00	22	2.96E+07	1.02E-01	3.11E+03	3.95	1.39	1.97	1.82	7.80	7.20	0.131	0.523	15.28	3.82	59.61	27.50	36.68	9.17	143.07	66.01
6	28.50	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.58	3.90	60.38	27.87	37.39	9.35	144.92	66.88
7	30.00	23	2.96E+07	1.02E-01	3.28E+03	3.91	1.41	1.97	1.82	7.71	7.12	0.126	0.506	15.82	3.96	61.01	28.16	37.98	9.49	146.42	67.58

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-105	-
Chainage	11+034	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	101.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-105	1.00	22.00	19.50	18.00	159.48	83.37	10.91	2.73
BH-105	1.00	23.50	21.00	19.50	169.55	92.07	11.06	2.76
BH-105	1.00	25.00	22.50	21.00	179.62	100.77	11.35	2.84
BH-105	1.00	26.50	24.00	22.50	189.70	109.47	11.60	2.90
BH-105	1.00	28.00	25.50	24.00	199.77	118.18	11.81	2.95
BH-105	1.00	29.50	27.00	25.50	209.84	126.88	11.98	3.00
BH-105	1.00	30.00	27.50	26.00	213.20	129.78	12.13	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.04	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.03	12.07	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.04	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	18.10	24.13	4.71	3.29	15.70	18.98	7.59	6.97
3	5.50	7.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	30.16	36.20	4.71	6.72	48.61	58.62	23.45	10.50
4	7.00	8.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	42.23	48.26	4.71	9.41	63.35	82.77	33.11	14.78
5	8.50	10.00	1.50	Granular	8.04	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	54.29	60.33	4.71	12.10	78.10	109.62	43.85	19.82
6	10.00	11.50	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	67.22	74.12	4.71	14.98	95.57	142.07	56.83	25.67
7	11.50	13.00	1.50	Granular	9.19	0.01	28	-	15.70	17.82	1.00	-	12.25	13.00	81.01	87.91	4.71	18.72	129.13	194.36	77.74	32.56
8	13.00	14.50	1.50	Granular	9.19	0.01	28	-	15.70	17.82	1.00	-	13.75	14.50	94.80	101.70	4.71	21.91	148.50	235.63	94.25	40.34
9	14.50	16.00	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	101.70	101.70	4.71	24.34	168.07	279.54	111.82	48.81
10	16.00	17.50	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	101.70	101.70	4.71	24.34	168.07	303.89	121.56	57.27
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	101.70	101.70	4.71	25.18	187.33	348.33	139.33	65.97
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	101.70	101.70	4.71	25.18	187.33	373.51	149.40	74.67
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	101.70	101.70	4.71	25.18	187.33	398.69	159.48	83.37
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	101.70	101.70	4.71	25.18	187.33	423.88	169.55	92.07
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	101.70	101.70	4.71	25.18	187.33	449.06	179.62	100.77
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	101.70	101.70	4.71	25.18	187.33	474.24	189.70	109.47
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	101.70	101.70	4.71	25.18	187.33	499.42	199.77	118.18
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	101.70	101.70	4.71	25.18	187.33	524.61	209.84	126.88
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	101.70	101.70	1.57	8.39	187.33	533.00	213.20	129.78

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.06E+03	3.43	1.17	2.00	1.83	6.84	6.27	0.183	0.733	10.91	2.73	37.34	17.10	26.19	6.55	89.62	41.03
2	22.50	22	2.96E+07	4.91E-02	3.13E+03	3.41	1.17	2.00	1.83	6.81	6.24	0.181	0.723	11.06	2.76	37.68	17.25	26.54	6.64	90.43	41.40
3	24.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.18	1.99	1.83	6.75	6.19	0.176	0.705	11.35	2.84	38.34	17.56	27.24	6.81	92.02	42.15
4	25.50	24	2.96E+07	4.91E-02	3.37E+03	3.36	1.19	1.99	1.83	6.71	6.15	0.172	0.690	11.60	2.90	38.90	17.82	27.84	6.96	93.36	42.77
5	27.00	24	2.96E+07	4.91E-02	3.46E+03	3.35	1.20	1.99	1.83	6.67	6.11	0.169	0.678	11.81	2.95	39.36	18.04	28.34	7.08	94.46	43.29
6	28.50	25	2.96E+07	4.91E-02	3.55E+03	3.33	1.20	1.99	1.83	6.63	6.08	0.167	0.668	11.98	3.00	39.75	18.22	28.76	7.19	95.40	43.73
7	30.00	25	2.96E+07	4.91E-02	3.61E+03	3.32	1.21	1.99	1.83	6.61	6.06	0.165	0.660	12.13	3.03	40.06	18.37	29.10	7.28	96.15	44.08

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-105	-
Chainage	11+034	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	130.78	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-105	1.20	22.00	19.50	18.00	253.55	115.45	14.20	3.55
BH-105	1.20	23.50	21.00	19.50	269.10	128.71	14.39	3.60
BH-105	1.20	25.00	22.50	21.00	284.64	141.96	14.77	3.69
BH-105	1.20	26.50	24.00	22.50	300.19	155.22	15.09	3.77
BH-105	1.20	28.00	25.50	24.00	315.73	168.48	15.36	3.84
BH-105	1.20	29.50	27.00	25.50	331.27	181.73	15.59	3.90
BH-105	1.20	30.00	27.50	26.00	336.45	186.15	15.77	3.94

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	8.04	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	6.03	12.07	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.04	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	18.10	24.13	5.65	3.94	22.97	26.91	10.76	9.81
3	5.50	7.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	30.16	36.20	5.65	8.07	71.25	83.26	33.31	14.45
4	7.00	8.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	42.23	48.26	5.65	11.29	92.49	115.79	46.32	19.98
5	8.50	10.00	1.50	Granular	8.04	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	54.29	60.33	5.65	14.52	113.72	151.54	60.62	26.42
6	10.00	11.50	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	67.22	74.12	5.65	17.98	139.07	194.87	77.95	33.83
7	11.50	13.00	1.50	Granular	9.19	0.01	28	-	15.70	17.82	1.00	-	12.25	13.00	81.01	87.91	5.65	22.47	187.59	265.86	106.34	42.50
8	13.00	14.50	1.50	Granular	9.19	0.01	28	-	15.70	17.82	1.00	-	13.75	14.50	94.80	101.70	5.65	26.29	215.48	320.04	128.02	52.24
9	14.50	16.00	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	15.25	16.00	108.97	116.24	5.65	31.30	277.17	413.03	165.21	63.37
10	16.00	17.50	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	16.75	17.50	123.51	130.78	5.65	35.48	310.39	481.73	192.69	75.68
11	17.50	19.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	130.78	130.78	5.65	38.86	345.96	556.16	222.46	88.94
12	19.00	20.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	130.78	130.78	5.65	38.86	345.96	595.02	238.01	102.20
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	130.78	130.78	5.65	38.86	345.96	633.88	253.55	115.45
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	130.78	130.78	5.65	38.86	345.96	672.74	269.10	128.71
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	130.78	130.78	5.65	38.86	345.96	711.60	284.64	141.96
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	130.78	130.78	5.65	38.86	345.96	750.46	300.19	155.22
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	130.78	130.78	5.65	38.86	345.96	789.32	315.73	168.48
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	130.78	130.78	5.65	38.86	345.96	828.18	331.27	181.73
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	130.78	130.78	1.88	12.95	345.96	841.14	336.45	186.15

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.06E+03	3.97	1.01	2.01	1.83	7.99	7.27	0.141	0.563	14.20	3.55	56.76	25.82	34.08	8.52	136.23	61.98
2	22.50	22	2.96E+07	1.02E-01	3.13E+03	3.95	1.01	2.01	1.83	7.96	7.24	0.139	0.556	14.39	3.60	57.27	26.06	34.54	8.63	137.44	62.54
3	24.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.02	2.01	1.83	7.89	7.18	0.135	0.542	14.77	3.69	58.27	26.52	35.45	8.86	139.85	63.66
4	25.50	24	2.96E+07	1.02E-01	3.37E+03	3.89	1.03	2.01	1.83	7.83	7.13	0.133	0.530	15.09	3.77	59.12	26.92	36.22	9.06	141.88	64.60
5	27.00	24	2.96E+07	1.02E-01	3.46E+03	3.87	1.03	2.01	1.83	7.79	7.09	0.130	0.521	15.36	3.84	59.81	27.24	36.87	9.22	143.55	65.38
6	28.50	25	2.96E+07	1.02E-01	3.55E+03	3.85	1.04	2.01	1.83	7.75	7.06	0.128	0.513	15.59	3.90	60.40	27.51	37.41	9.35	144.97	66.04
7	30.00	25	2.96E+07	1.02E-01	3.61E+03	3.84	1.04	2.01	1.83	7.72	7.03	0.127	0.507	15.77	3.94	60.88	27.74	37.86	9.46	146.12	66.57

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-106	-
Chainage	11+134	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	96.30	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-106	1.00	22.00	19.50	19.50	149.82	79.39	10.04	2.51
BH-106	1.00	23.50	21.00	21.00	159.36	87.72	10.19	2.55
BH-106	1.00	25.00	22.50	22.50	169.05	96.05	10.46	2.61
BH-106	1.00	26.50	24.00	24.00	178.59	104.37	10.68	2.67
BH-106	1.00	28.00	25.50	25.50	188.13	112.70	10.87	2.72
BH-106	1.00	29.50	27.00	27.00	197.66	121.02	11.03	2.76
BH-106	1.00	30.00	27.50	27.50	200.84	123.80	11.16	2.79

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.05	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	4.71	1.11	12.09	13.20	5.28	4.71
2	4.00	5.50	1.50	Granular	7.44	0.05	25	-	10.00	10.88	1.00	-	4.75	5.50	16.37	21.96	4.71	3.38	21.76	26.25	10.50	7.31
3	5.50	7.00	1.50	Granular	7.44	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	27.54	33.12	4.71	5.68	31.34	41.51	16.60	10.55
4	7.00	8.50	1.50	Granular	7.44	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	38.70	44.29	4.71	8.31	49.54	68.02	27.21	14.52
5	8.50	10.00	1.50	Granular	8.49	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	50.66	57.03	4.71	10.87	63.28	92.63	37.05	19.21
6	10.00	11.50	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	10.75	11.50	63.40	69.77	4.71	14.13	89.88	133.36	53.34	24.82
7	11.50	13.00	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	12.25	13.00	76.14	82.51	4.71	16.97	105.45	165.89	66.36	31.22
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	89.40	96.30	4.71	20.66	140.92	222.03	88.81	38.65
9	14.50	16.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	96.30	96.30	4.71	22.26	140.92	244.28	97.71	46.54
10	16.00	17.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	96.30	96.30	4.71	23.05	159.15	285.57	114.23	54.64
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	96.30	96.30	4.71	23.05	159.15	308.62	123.45	62.74
12	19.00	20.50	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	96.30	96.30	4.71	23.85	177.39	350.70	140.28	71.07
13	20.50	22.00	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	96.30	96.30	4.71	23.85	177.39	374.55	149.82	79.39
14	22.00	23.50	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	96.30	96.30	4.71	23.85	177.39	398.39	159.36	87.72
15	23.50	25.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	96.30	96.30	4.71	23.85	177.77	422.62	169.05	96.05
16	25.00	26.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	96.30	96.30	4.71	23.85	177.77	446.47	178.59	104.37
17	26.50	28.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	96.30	96.30	4.71	23.85	177.77	470.31	188.13	112.70
18	28.00	29.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	96.30	96.30	4.71	23.85	177.77	494.16	197.66	121.02
19	29.50	30.00	0.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	96.30	96.30	1.57	7.95	177.77	502.11	200.84	123.80

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.07E+03	3.43	0.73	2.05	1.85	7.04	6.32	0.199	0.797	10.04	2.51	35.33	15.87	24.10	6.02	84.78	38.10
2	22.50	22	2.96E+07	4.91E-02	3.14E+03	3.41	0.73	2.05	1.85	7.00	6.29	0.196	0.785	10.19	2.55	35.68	16.04	24.46	6.12	85.64	38.49
3	24.00	23	2.96E+07	4.91E-02	3.28E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.46	2.61	36.30	16.32	25.10	6.27	87.12	39.16
4	25.50	24	2.96E+07	4.91E-02	3.39E+03	3.36	0.74	2.05	1.84	6.89	6.20	0.187	0.749	10.68	2.67	36.82	16.56	25.64	6.41	88.37	39.74
5	27.00	24	2.96E+07	4.91E-02	3.48E+03	3.34	0.75	2.05	1.84	6.85	6.16	0.184	0.736	10.87	2.72	37.25	16.75	26.09	6.52	89.40	40.21
6	28.50	25	2.96E+07	4.91E-02	3.56E+03	3.33	0.75	2.05	1.84	6.82	6.14	0.181	0.725	11.03	2.76	37.62	16.92	26.48	6.62	90.28	40.61
7	30.00	25	2.96E+07	4.91E-02	3.63E+03	3.31	0.75	2.05	1.84	6.79	6.11	0.179	0.717	11.16	2.79	37.91	17.06	26.79	6.70	90.99	40.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-106	-
Chainage	11+134	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	123.88	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-106	1.20	22.00	19.50	19.50	238.59	110.09	13.15	3.29
BH-106	1.20	23.50	21.00	21.00	253.32	122.77	13.34	3.34
BH-106	1.20	25.00	22.50	22.50	268.31	135.45	13.69	3.42
BH-106	1.20	26.50	24.00	24.00	283.03	148.13	13.99	3.50
BH-106	1.20	28.00	25.50	25.50	297.75	160.81	14.23	3.56
BH-106	1.20	29.50	27.00	27.00	312.48	173.50	14.44	3.61
BH-106	1.20	30.00	27.50	27.50	317.39	177.72	14.61	3.65

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.05	25	-	10.00	10.88	1.00	-	3.25	4.00	5.40	10.79	5.65	1.34	18.22	19.56	7.82	6.71
2	4.00	5.50	1.50	Granular	7.44	0.05	25	-	10.00	10.88	1.00	-	4.75	5.50	16.37	21.96	5.65	4.05	32.18	37.57	15.03	10.22
3	5.50	7.00	1.50	Granular	7.44	0.05	25	-	10.00	10.88	1.00	-	6.25	7.00	27.54	33.12	5.65	6.82	45.97	58.18	23.27	14.50
4	7.00	8.50	1.50	Granular	7.44	0.04	26	-	11.90	13.19	1.00	-	7.75	8.50	38.70	44.29	5.65	9.97	72.34	94.52	37.81	19.67
5	8.50	10.00	1.50	Granular	8.49	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	50.66	57.03	5.65	13.05	92.27	127.49	51.00	25.70
6	10.00	11.50	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	10.75	11.50	63.40	69.77	5.65	16.95	130.75	182.93	73.17	32.82
7	11.50	13.00	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	12.25	13.00	76.14	82.51	5.65	20.36	153.17	225.71	90.28	40.89
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	89.40	96.30	5.65	24.79	204.56	301.89	120.76	50.21
9	14.50	16.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	103.19	110.09	5.65	28.62	232.44	358.40	143.36	60.60
10	16.00	17.50	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	116.98	123.88	5.65	33.60	294.03	453.58	181.43	72.38
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	123.88	123.88	5.65	35.58	294.03	489.16	195.67	84.72
12	19.00	20.50	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	19.75	20.50	123.88	123.88	5.65	36.81	327.72	559.67	223.87	97.40
13	20.50	22.00	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	21.25	22.00	123.88	123.88	5.65	36.81	327.72	596.48	238.59	110.09
14	22.00	23.50	1.50	Granular	9.19	0.01	30	-	19.50	22.44	1.00	-	22.75	23.50	123.88	123.88	5.65	36.81	327.72	633.29	253.32	122.77
15	23.50	25.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	24.25	25.00	123.88	123.88	5.65	36.81	328.39	670.77	268.31	135.45
16	25.00	26.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	25.75	26.50	123.88	123.88	5.65	36.81	328.39	707.58	283.03	148.13
17	26.50	28.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	27.25	28.00	123.88	123.88	5.65	36.81	328.39	744.39	297.75	160.81
18	28.00	29.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	28.75	29.50	123.88	123.88	5.65	36.81	328.39	781.20	312.48	173.50
19	29.50	30.00	0.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	29.75	30.00	123.88	123.88	1.88	12.27	328.39	793.47	317.39	177.72

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.07E+03	3.97	0.63	2.07	1.85	8.20	7.34	0.152	0.609	13.15	3.29	53.92	24.11	31.55	7.89	129.40	57.86
2	22.50	22	2.96E+07	1.02E-01	3.14E+03	3.95	0.63	2.07	1.85	8.16	7.30	0.150	0.600	13.34	3.34	54.46	24.35	32.03	8.01	130.69	58.45
3	24.00	23	2.96E+07	1.02E-01	3.28E+03	3.91	0.64	2.07	1.85	8.09	7.24	0.146	0.584	13.69	3.42	55.39	24.78	32.86	8.21	132.95	59.47
4	25.50	24	2.96E+07	1.02E-01	3.39E+03	3.89	0.64	2.07	1.85	8.04	7.19	0.143	0.572	13.99	3.50	56.19	25.14	33.56	8.39	134.85	60.34
5	27.00	24	2.96E+07	1.02E-01	3.48E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.562	14.23	3.56	56.84	25.44	34.15	8.54	136.41	61.04
6	28.50	25	2.96E+07	1.02E-01	3.56E+03	3.85	0.65	2.07	1.85	7.95	7.12	0.139	0.554	14.44	3.61	57.39	25.69	34.65	8.66	137.74	61.65
7	30.00	25	2.96E+07	1.02E-01	3.63E+03	3.83	0.65	2.07	1.85	7.92	7.09	0.137	0.548	14.61	3.65	57.84	25.89	35.06	8.76	138.82	62.14

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-107	-
Chainage	11+240	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.92	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-107	1.00	22.00	19.50	16.50	151.14	78.91	10.25	2.56
BH-107	1.00	23.50	21.00	18.00	160.94	87.42	10.73	2.68
BH-107	1.00	25.00	22.50	19.50	170.74	95.93	11.13	2.78
BH-107	1.00	26.50	24.00	21.00	180.54	104.44	11.48	2.87
BH-107	1.00	28.00	25.50	22.50	190.34	112.95	11.76	2.94
BH-107	1.00	29.50	27.00	24.00	200.13	121.45	12.00	3.00
BH-107	1.00	30.00	27.50	24.50	203.40	124.29	12.21	3.05

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.39	0.02	20	-	0.00	5.39	1.00	-	3.25	4.00	4.80	9.59	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.04	0.02	20	-	0.00	5.39	1.00	-	4.75	5.50	15.62	21.66	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	27.69	33.72	4.71	6.17	45.58	51.75	20.70	9.42
4	7.00	8.50	1.50	Granular	7.94	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	39.68	45.64	4.71	8.84	60.09	75.10	30.04	13.55
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	51.59	57.55	4.71	11.07	63.57	89.65	35.86	18.30
6	10.00	11.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	64.45	71.34	4.71	13.83	78.49	118.41	47.36	23.82
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	78.24	85.13	4.71	17.44	109.03	166.39	66.55	30.35
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	92.03	98.92	4.71	20.51	125.89	203.75	81.50	37.74
9	14.50	16.00	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	98.92	98.92	4.71	22.86	144.60	245.33	98.13	45.80
10	16.00	17.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	98.92	98.92	4.71	22.86	144.60	268.19	107.28	53.85
11	17.50	19.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	98.92	98.92	4.71	23.68	163.66	310.93	124.37	62.13
12	19.00	20.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	98.92	98.92	4.71	23.68	163.66	334.61	133.84	70.41
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	98.92	98.92	4.71	24.50	182.42	377.86	151.14	78.91
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	98.92	98.92	4.71	24.50	182.42	402.35	160.94	87.42
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	98.92	98.92	4.71	24.50	182.42	426.85	170.74	95.93
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	98.92	98.92	4.71	24.50	182.42	451.34	180.54	104.44
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	98.92	98.92	4.71	24.50	182.42	475.84	190.34	112.95
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	98.92	98.92	4.71	24.50	182.42	500.33	200.13	121.45
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	98.92	98.92	1.57	8.17	182.42	508.50	203.40	124.29

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.51E+03	3.57	1.54	1.96	1.82	6.99	6.48	0.195	0.781	10.25	2.56	35.81	16.60	24.59	6.15	85.95	39.83
2	22.50	19	2.96E+07	4.91E-02	2.70E+03	3.52	1.56	1.96	1.81	6.88	6.38	0.186	0.745	10.73	2.68	36.94	17.13	25.76	6.44	88.65	41.11
3	24.00	20	2.96E+07	4.91E-02	2.86E+03	3.48	1.58	1.96	1.81	6.80	6.31	0.180	0.718	11.13	2.78	37.85	17.56	26.72	6.68	90.84	42.15
4	25.50	21	2.96E+07	4.91E-02	2.99E+03	3.44	1.60	1.95	1.81	6.73	6.25	0.174	0.697	11.48	2.87	38.62	17.93	27.54	6.89	92.68	43.02
5	27.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.68	6.20	0.170	0.680	11.76	2.94	39.25	18.23	28.22	7.06	94.20	43.74
6	28.50	23	2.96E+07	4.91E-02	3.21E+03	3.40	1.62	1.95	1.81	6.63	6.16	0.167	0.666	12.00	3.00	39.79	18.48	28.81	7.20	95.50	44.36
7	30.00	23	2.96E+07	4.91E-02	3.30E+03	3.38	1.63	1.95	1.81	6.59	6.13	0.164	0.655	12.21	3.05	40.24	18.70	29.29	7.32	96.58	44.87

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-107	-
Chainage	11+240	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	126.50	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-107	1.20	22.00	19.50	16.50	240.52	109.37	13.31	3.33
BH-107	1.20	23.50	21.00	18.00	255.55	122.27	13.94	3.49
BH-107	1.20	25.00	22.50	19.50	270.59	135.18	14.46	3.62
BH-107	1.20	26.50	24.00	21.00	285.62	148.08	14.91	3.73
BH-107	1.20	28.00	25.50	22.50	300.66	160.98	15.28	3.82
BH-107	1.20	29.50	27.00	24.00	315.70	173.88	15.59	3.90
BH-107	1.20	30.00	27.50	24.50	320.71	178.18	15.86	3.96

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.39	0.02	20	-	0.00	5.39	1.00	-	3.25	4.00	4.80	9.59	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.04	0.02	20	-	0.00	5.39	1.00	-	4.75	5.50	15.62	21.66	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	27.69	33.72	5.65	7.40	66.90	74.30	29.72	13.16
4	7.00	8.50	1.50	Granular	7.94	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	39.68	45.64	5.65	10.61	87.77	105.79	42.32	18.50
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	51.59	57.55	5.65	13.29	92.61	123.91	49.57	24.60
6	10.00	11.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	64.45	71.34	5.65	16.60	114.27	162.17	64.87	31.62
7	11.50	13.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	12.25	13.00	78.24	85.13	5.65	20.92	158.45	227.27	90.91	39.85
8	13.00	14.50	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	13.75	14.50	92.03	98.92	5.65	24.61	182.72	276.15	110.46	49.12
9	14.50	16.00	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	105.82	112.71	5.65	29.35	237.75	360.53	144.21	59.71
10	16.00	17.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	119.61	126.50	5.65	33.17	265.64	421.59	168.64	71.38
11	17.50	19.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	126.50	126.50	5.65	36.34	300.62	492.91	197.17	83.93
12	19.00	20.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	126.50	126.50	5.65	36.34	300.62	529.25	211.70	96.47
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	126.50	126.50	5.65	37.59	335.07	601.29	240.52	109.37
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	126.50	126.50	5.65	37.59	335.07	638.88	255.55	122.27
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	126.50	126.50	5.65	37.59	335.07	676.47	270.59	135.18
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	126.50	126.50	5.65	37.59	335.07	714.06	285.62	148.08
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	126.50	126.50	5.65	37.59	335.07	751.65	300.66	160.98
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	126.50	126.50	5.65	37.59	335.07	789.24	315.70	173.88
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	126.50	126.50	1.88	12.53	335.07	801.77	320.71	178.18

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.51E+03	4.13	1.33	1.98	1.82	8.17	7.52	0.150	0.601	13.31	3.33	54.37	25.04	31.95	7.99	130.48	60.08
2	22.50	19	2.96E+07	1.02E-01	2.70E+03	4.07	1.35	1.98	1.82	8.04	7.41	0.143	0.574	13.94	3.49	56.08	25.84	33.47	8.37	134.59	62.01
3	24.00	20	2.96E+07	1.02E-01	2.86E+03	4.02	1.37	1.97	1.82	7.95	7.33	0.138	0.553	14.46	3.62	57.46	26.49	34.72	8.68	137.91	63.58
4	25.50	21	2.96E+07	1.02E-01	2.99E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.134	0.537	14.91	3.73	58.63	27.04	35.78	8.94	140.71	64.90
5	27.00	22	2.96E+07	1.02E-01	3.11E+03	3.96	1.39	1.97	1.82	7.80	7.20	0.131	0.524	15.28	3.82	59.59	27.49	36.66	9.17	143.02	65.98
6	28.50	23	2.96E+07	1.02E-01	3.21E+03	3.93	1.40	1.97	1.82	7.75	7.15	0.128	0.513	15.59	3.90	60.41	27.88	37.42	9.36	144.99	66.91
7	30.00	23	2.96E+07	1.02E-01	3.30E+03	3.91	1.41	1.97	1.82	7.71	7.11	0.126	0.505	15.86	3.96	61.09	28.20	38.06	9.51	146.62	67.68

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-108	-
Chainage	11+329	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	95.92	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-108	1.00	22.00	19.50	16.50	148.29	78.41	11.05	2.76
BH-108	1.00	23.50	21.00	18.00	157.80	86.71	11.45	2.86
BH-108	1.00	25.00	22.50	19.50	167.30	95.01	11.77	2.94
BH-108	1.00	26.50	24.00	21.00	176.80	103.31	12.05	3.01
BH-108	1.00	28.00	25.50	22.50	186.30	111.61	12.28	3.07
BH-108	1.00	29.50	27.00	24.00	195.80	119.91	12.48	3.12
BH-108	1.00	30.00	27.50	24.50	198.97	122.67	12.63	3.16

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	26.11	32.15	4.71	5.82	43.66	49.48	19.79	9.33
4	7.00	8.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	38.18	44.21	4.71	8.51	58.40	72.73	29.09	13.36
5	8.50	10.00	1.50	Granular	8.04	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	50.24	56.28	4.71	10.78	62.29	87.40	34.96	18.03
6	10.00	11.50	1.50	Granular	8.04	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	62.31	68.34	4.71	13.37	74.83	113.32	45.33	23.42
7	11.50	13.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	75.24	82.13	4.71	17.39	121.02	176.90	70.76	29.94
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	89.03	95.92	4.71	20.58	140.39	216.84	86.73	37.35
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	95.92	95.92	4.71	22.96	158.90	258.31	103.32	45.43
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	95.92	95.92	4.71	22.96	158.90	281.27	112.51	53.51
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	95.92	95.92	4.71	23.75	177.11	323.23	129.29	61.81
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	95.92	95.92	4.71	23.75	177.11	346.98	138.79	70.11
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	95.92	95.92	4.71	23.75	177.11	370.74	148.29	78.41
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	95.92	95.92	4.71	23.75	177.11	394.49	157.80	86.71
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	95.92	95.92	4.71	23.75	177.11	418.24	167.30	95.01
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	95.92	95.92	4.71	23.75	177.11	441.99	176.80	103.31
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	95.92	95.92	4.71	23.75	177.11	465.75	186.30	111.61
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	95.92	95.92	4.71	23.75	177.11	489.50	195.80	119.91
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	95.92	95.92	1.57	7.92	177.11	497.42	198.97	122.67

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.181	0.724	11.05	2.76	37.65	17.47	26.51	6.63	90.36	41.93
2	22.50	21	2.96E+07	4.91E-02	2.98E+03	3.45	1.60	1.95	1.81	6.74	6.25	0.175	0.699	11.45	2.86	38.55	17.90	27.47	6.87	92.52	42.95
3	24.00	22	2.96E+07	4.91E-02	3.11E+03	3.42	1.61	1.95	1.81	6.67	6.20	0.170	0.680	11.77	2.94	39.28	18.24	28.25	7.06	94.28	43.78
4	25.50	23	2.96E+07	4.91E-02	3.23E+03	3.39	1.62	1.95	1.81	6.62	6.15	0.166	0.664	12.05	3.01	39.90	18.53	28.92	7.23	95.76	44.48
5	27.00	23	2.96E+07	4.91E-02	3.33E+03	3.37	1.63	1.95	1.81	6.58	6.11	0.163	0.651	12.28	3.07	40.40	18.77	29.47	7.37	96.97	45.05
6	28.50	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.64	1.95	1.81	6.55	6.08	0.160	0.641	12.48	3.12	40.83	18.98	29.94	7.49	97.99	45.54
7	30.00	24	2.96E+07	4.91E-02	3.48E+03	3.34	1.65	1.95	1.81	6.52	6.06	0.158	0.633	12.63	3.16	41.17	19.14	30.32	7.58	98.81	45.93

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-108	-
Chainage	11+329	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.00	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-108	1.20	22.00	19.50	16.50	239.15	109.49	14.35	3.59
BH-108	1.20	23.50	21.00	18.00	254.01	122.27	14.87	3.72
BH-108	1.20	25.00	22.50	19.50	268.87	135.04	15.29	3.82
BH-108	1.20	26.50	24.00	21.00	283.73	147.82	15.65	3.91
BH-108	1.20	28.00	25.50	22.50	298.58	160.59	15.95	3.99
BH-108	1.20	29.50	27.00	24.00	313.44	173.37	16.21	4.05
BH-108	1.20	30.00	27.50	24.50	318.39	177.63	16.41	4.10

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.02	10.04	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	6.69	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	15.06	20.08	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	26.11	32.15	5.65	6.98	64.13	71.11	28.44	13.04
4	7.00	8.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	38.18	44.21	5.65	10.21	85.36	102.55	41.02	18.27
5	8.50	10.00	1.50	Granular	8.04	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	50.24	56.28	5.65	12.94	90.78	120.91	48.37	24.27
6	10.00	11.50	1.50	Granular	8.04	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	62.31	68.34	5.65	16.05	108.85	155.03	62.01	31.14
7	11.50	13.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	75.24	82.13	5.65	20.87	175.91	242.96	97.18	39.36
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	89.03	95.92	5.65	24.69	203.80	295.53	118.21	48.64
9	14.50	16.00	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	103.19	110.46	5.65	29.64	263.98	385.35	154.14	59.32
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	117.73	125.00	5.65	33.82	297.20	452.39	180.96	71.16
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	125.00	125.00	5.65	37.14	331.25	523.59	209.44	83.94
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	125.00	125.00	5.65	37.14	331.25	560.74	224.29	96.71
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	125.00	125.00	5.65	37.14	331.25	597.88	239.15	109.49
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	125.00	125.00	5.65	37.14	331.25	635.03	254.01	122.27
15	23.50	25.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	125.00	125.00	5.65	37.14	331.25	672.17	268.87	135.04
16	25.00	26.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	125.00	125.00	5.65	37.14	331.25	709.31	283.73	147.82
17	26.50	28.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	125.00	125.00	5.65	37.14	331.25	746.46	298.58	160.59
18	28.00	29.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	125.00	125.00	5.65	37.14	331.25	783.60	313.44	173.37
19	29.50	30.00	0.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	125.00	125.00	1.88	12.38	331.25	795.98	318.39	177.63

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	20	2.96E+07	1.02E-01	2.82E+03	4.03	1.36	1.98	1.82	7.97	7.34	0.139	0.557	14.35	3.59	57.16	26.35	34.44	8.61	137.19	63.24
2	22.50	21	2.96E+07	1.02E-01	2.98E+03	3.99	1.38	1.97	1.82	7.87	7.26	0.135	0.538	14.87	3.72	58.53	26.99	35.69	8.92	140.47	64.78
3	24.00	22	2.96E+07	1.02E-01	3.11E+03	3.95	1.39	1.97	1.82	7.80	7.20	0.131	0.523	15.29	3.82	59.64	27.52	36.70	9.18	143.13	66.04
4	25.50	23	2.96E+07	1.02E-01	3.23E+03	3.93	1.40	1.97	1.82	7.74	7.14	0.128	0.511	15.65	3.91	60.57	27.96	37.57	9.39	145.38	67.09
5	27.00	23	2.96E+07	1.02E-01	3.33E+03	3.90	1.41	1.97	1.82	7.69	7.10	0.125	0.501	15.95	3.99	61.34	28.32	38.29	9.57	147.22	67.96
6	28.50	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.42	1.97	1.82	7.65	7.06	0.123	0.494	16.21	4.05	61.99	28.62	38.90	9.72	148.78	68.70
7	30.00	24	2.96E+07	1.02E-01	3.48E+03	3.87	1.42	1.97	1.82	7.62	7.04	0.122	0.487	16.41	4.10	62.51	28.87	39.39	9.85	150.02	69.28

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-109	-
Chainage	11+400	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-109	1.00	22.00	19.50	19.50	153.33	80.74	9.84	2.46
BH-109	1.00	23.50	21.00	21.00	163.07	89.21	10.17	2.54
BH-109	1.00	25.00	22.50	22.50	172.30	97.68	10.45	2.61
BH-109	1.00	26.50	24.00	24.00	182.04	106.14	10.69	2.67
BH-109	1.00	28.00	25.50	25.50	191.78	114.61	10.88	2.72
BH-109	1.00	29.50	27.00	27.00	201.52	123.08	11.05	2.76
BH-109	1.00	30.00	27.50	27.50	204.77	125.90	11.19	2.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.40	10.79	4.71	0.98	7.59	8.57	3.43	4.67
2	4.00	5.50	1.50	Granular	7.19	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	16.19	21.58	4.71	2.94	14.04	17.96	7.18	7.14
3	5.50	7.00	1.50	Granular	7.19	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	26.98	32.37	4.71	6.01	43.47	53.40	21.36	10.48
4	7.00	8.50	1.50	Granular	7.19	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	37.77	43.16	4.71	8.42	56.66	75.00	30.00	14.48
5	8.50	10.00	1.50	Granular	9.19	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	50.06	56.95	4.71	10.74	63.53	92.62	37.05	19.14
6	10.00	11.50	1.50	Granular	9.19	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	63.85	70.74	4.71	13.70	77.87	120.66	48.26	24.63
7	11.50	13.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	77.64	84.53	4.71	17.94	124.39	185.13	74.05	31.30
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	91.43	98.32	4.71	21.13	143.76	225.62	90.25	38.87
9	14.50	16.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	98.32	98.32	4.71	23.54	162.37	267.77	107.11	47.10
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	98.32	98.32	4.71	23.54	162.71	291.65	116.66	55.34
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	98.32	98.32	4.71	24.35	181.36	334.64	133.86	63.81
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	98.32	98.32	4.71	24.35	181.36	358.99	143.59	72.28
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	98.32	98.32	4.71	24.35	181.36	383.33	153.33	80.74
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	98.32	98.32	4.71	24.35	181.36	407.68	163.07	89.21
15	23.50	25.00	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	98.32	98.32	4.71	24.35	180.09	430.76	172.30	97.68
16	25.00	26.50	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	98.32	98.32	4.71	24.35	180.09	455.10	182.04	106.14
17	26.50	28.00	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	98.32	98.32	4.71	24.35	180.09	479.45	191.78	114.61
18	28.00	29.50	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	98.32	98.32	4.71	24.35	180.09	503.80	201.52	123.08
19	29.50	30.00	0.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	98.32	98.32	1.57	8.12	180.09	511.91	204.77	125.90

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.97E+03	3.45	0.72	2.05	1.85	7.09	6.37	0.203	0.813	9.84	2.46	34.85	15.65	23.61	5.90	83.63	37.57
2	22.50	22	2.96E+07	4.91E-02	3.14E+03	3.41	0.73	2.05	1.85	7.01	6.30	0.197	0.786	10.17	2.54	35.64	16.02	24.42	6.10	85.54	38.44
3	24.00	23	2.96E+07	4.91E-02	3.27E+03	3.38	0.74	2.05	1.84	6.94	6.24	0.191	0.765	10.45	2.61	36.29	16.31	25.08	6.27	87.09	39.15
4	25.50	24	2.96E+07	4.91E-02	3.39E+03	3.36	0.74	2.05	1.84	6.89	6.20	0.187	0.749	10.69	2.67	36.83	16.56	25.65	6.41	88.39	39.74
5	27.00	24	2.96E+07	4.91E-02	3.49E+03	3.34	0.75	2.05	1.84	6.85	6.16	0.184	0.735	10.88	2.72	37.27	16.76	26.12	6.53	89.46	40.23
6	28.50	25	2.96E+07	4.91E-02	3.57E+03	3.32	0.75	2.05	1.84	6.82	6.13	0.181	0.724	11.05	2.76	37.66	16.94	26.52	6.63	90.38	40.65
7	30.00	26	2.96E+07	4.91E-02	3.64E+03	3.31	0.75	2.05	1.84	6.79	6.11	0.179	0.715	11.19	2.80	37.97	17.08	26.85	6.71	91.13	41.00

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-109	-
Chainage	11+400	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	126.65	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Ground Water Table From OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-109	1.20	22.00	19.50	19.50	244.44	112.02	12.88	3.22
BH-109	1.20	23.50	21.00	21.00	259.50	124.93	13.32	3.33
BH-109	1.20	25.00	22.50	22.50	273.68	137.84	13.68	3.42
BH-109	1.20	26.50	24.00	24.00	288.73	150.76	13.99	3.50
BH-109	1.20	28.00	25.50	25.50	303.78	163.67	14.24	3.56
BH-109	1.20	29.50	27.00	27.00	318.84	176.58	14.46	3.62
BH-109	1.20	30.00	27.50	27.50	323.86	180.89	14.64	3.66

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.03	22	-	4.00	7.59	1.00	-	3.25	4.00	5.40	10.79	5.65	1.18	11.25	12.43	4.97	6.66
2	4.00	5.50	1.50	Granular	7.19	0.03	22	-	4.00	7.59	1.00	-	4.75	5.50	16.19	21.58	5.65	3.53	20.54	25.24	10.10	10.03
3	5.50	7.00	1.50	Granular	7.19	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	26.98	32.37	5.65	7.21	63.72	75.64	30.26	14.42
4	7.00	8.50	1.50	Granular	7.19	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	37.77	43.16	5.65	10.10	82.71	104.73	41.89	19.62
5	8.50	10.00	1.50	Granular	9.19	0.04	26	-	11.90	13.19	1.00	-	9.25	10.00	50.06	56.95	5.65	12.89	92.72	127.63	51.05	25.61
6	10.00	11.50	1.50	Granular	9.19	0.04	26	-	11.90	13.19	1.00	-	10.75	11.50	63.85	70.74	5.65	16.44	113.37	164.72	65.89	32.59
7	11.50	13.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	77.64	84.53	5.65	21.53	180.77	253.65	101.46	40.99
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	91.43	98.32	5.65	25.36	208.65	306.89	122.76	50.47
9	14.50	16.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	15.25	16.00	105.22	112.11	5.65	30.22	267.15	395.61	158.24	61.30
10	16.00	17.50	1.50	Granular	9.69	0.02	29	-	17.60	20.13	1.00	-	16.75	17.50	119.38	126.65	5.65	34.29	300.97	463.72	185.49	73.28
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	126.65	126.65	5.65	37.63	335.46	535.84	214.34	86.19
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	126.65	126.65	5.65	37.63	335.46	573.48	229.39	99.10
13	20.50	22.00	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	21.25	22.00	126.65	126.65	5.65	37.63	335.46	611.11	244.44	112.02
14	22.00	23.50	1.50	Granular	9.69	0.05	30	-	19.50	22.44	1.00	-	22.75	23.50	126.65	126.65	5.65	37.63	335.46	648.75	259.50	124.93
15	23.50	25.00	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	24.25	25.00	126.65	126.65	5.65	37.63	333.26	684.19	273.68	137.84
16	25.00	26.50	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	25.75	26.50	126.65	126.65	5.65	37.63	333.26	721.83	288.73	150.76
17	26.50	28.00	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	27.25	28.00	126.65	126.65	5.65	37.63	333.26	759.46	303.78	163.67
18	28.00	29.50	1.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	28.75	29.50	126.65	126.65	5.65	37.63	333.26	797.09	318.84	176.58
19	29.50	30.00	0.50	Granular	8.04	0.05	30	-	19.50	22.44	1.00	-	29.75	30.00	126.65	126.65	1.88	12.54	333.26	809.64	323.86	180.89

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.97E+03	3.99	0.63	2.07	1.85	8.26	7.38	0.155	0.621	12.88	3.22	53.19	23.78	30.91	7.73	127.65	57.07
2	22.50	22	2.96E+07	1.02E-01	3.14E+03	3.95	0.63	2.07	1.85	8.17	7.30	0.150	0.601	13.32	3.33	54.39	24.33	31.97	7.99	130.55	58.38
3	24.00	23	2.96E+07	1.02E-01	3.27E+03	3.92	0.64	2.07	1.85	8.09	7.24	0.146	0.585	13.68	3.42	55.37	24.77	32.84	8.21	132.89	59.45
4	25.50	24	2.96E+07	1.02E-01	3.39E+03	3.89	0.64	2.07	1.85	8.03	7.19	0.143	0.572	13.99	3.50	56.20	25.14	33.57	8.39	134.87	60.34
5	27.00	24	2.96E+07	1.02E-01	3.49E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.140	0.562	14.24	3.56	56.87	25.45	34.18	8.55	136.50	61.08
6	28.50	25	2.96E+07	1.02E-01	3.57E+03	3.85	0.65	2.07	1.85	7.95	7.11	0.138	0.553	14.46	3.62	57.45	25.72	34.71	8.68	137.89	61.72
7	30.00	26	2.96E+07	1.02E-01	3.64E+03	3.83	0.65	2.07	1.85	7.91	7.08	0.137	0.546	14.64	3.66	57.93	25.93	35.14	8.78	139.03	62.24

A.13. Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116)

The following table presents the recommended safe capacities of bored cast-in-situ RCC piles, considering mobilization of both skin friction and end bearing, under compression, uplift, and lateral loading. The capacities are based on an assumed cut-off level at 2.5m below the existing ground level (EGL).

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-111	1.00	22.00	19.50	19.50	325.44	148.73	10.72	2.68	159.65	83.68	10.72	2.68
BH-111	1.00	23.50	21.00	21.00	345.67	164.55	10.88	2.72	169.69	92.35	10.88	2.72
BH-111	1.00	25.00	22.50	22.50	365.91	180.36	11.08	2.77	179.72	101.03	11.08	2.77
BH-111	1.00	26.50	24.00	24.00	386.14	196.18	11.26	2.81	189.76	109.70	11.26	2.81
BH-111	1.00	28.00	25.50	25.50	406.38	211.99	11.40	2.85	199.79	118.38	11.40	2.85
BH-111	1.00	29.50	27.00	27.00	426.61	227.80	11.52	2.88	209.83	127.05	11.52	2.88
BH-111	1.00	30.00	27.50	27.50	433.36	233.08	11.62	2.90	213.17	129.94	11.62	2.90
BH-111	1.20	22.00	19.50	19.50	470.24	193.97	14.03	3.51	253.81	115.90	14.03	3.51
BH-111	1.20	23.50	21.00	21.00	497.98	215.76	14.24	3.56	269.31	129.12	14.24	3.56
BH-111	1.20	25.00	22.50	22.50	525.72	237.55	14.51	3.63	284.81	142.35	14.51	3.63
BH-111	1.20	26.50	24.00	24.00	553.46	259.34	14.74	3.68	300.31	155.57	14.74	3.68
BH-111	1.20	28.00	25.50	25.50	581.20	281.13	14.92	3.73	315.81	168.80	14.92	3.73
BH-111	1.20	29.50	27.00	27.00	608.93	302.93	15.08	3.77	331.31	182.02	15.08	3.77
BH-111	1.20	30.00	27.50	27.50	618.18	310.19	15.20	3.80	336.48	186.43	15.20	3.80
BH-112	1.00	22.00	19.50	13.50	268.55	122.87	10.17	2.54	127.61	69.95	10.17	2.54
BH-112	1.00	23.50	21.00	15.00	287.39	137.71	10.52	2.63	136.59	77.89	10.52	2.63
BH-112	1.00	25.00	22.50	16.50	321.52	153.00	11.02	2.76	153.01	86.05	11.02	2.76
BH-112	1.00	26.50	24.00	18.00	341.01	168.30	11.45	2.86	162.30	94.20	11.45	2.86
BH-112	1.00	28.00	25.50	19.50	360.50	183.59	11.80	2.95	171.60	102.35	11.80	2.95

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-112	1.00	29.50	27.00	21.00	380.00	198.89	12.10	3.03	180.89	110.51	12.10	3.03
BH-112	1.00	30.00	27.50	21.50	386.49	203.98	12.35	3.09	183.99	113.23	12.35	3.09
BH-112	1.20	22.00	19.50	13.50	389.51	161.38	13.27	3.32	204.70	97.88	13.27	3.32
BH-112	1.20	23.50	21.00	15.00	415.17	181.72	13.73	3.43	218.53	109.94	13.73	3.43
BH-112	1.20	25.00	22.50	16.50	465.66	202.68	14.39	3.60	245.97	122.33	14.39	3.60
BH-112	1.20	26.50	24.00	18.00	492.20	223.63	14.94	3.74	260.27	134.71	14.94	3.74
BH-112	1.20	28.00	25.50	19.50	518.75	244.59	15.41	3.85	274.58	147.10	15.41	3.85
BH-112	1.20	29.50	27.00	21.00	545.29	265.54	15.81	3.95	288.88	159.49	15.81	3.95
BH-112	1.20	30.00	27.50	21.50	554.14	272.53	16.13	4.03	293.65	163.62	16.13	4.03
BH-113	1.00	22.00	19.50	19.50	327.63	148.70	10.11	2.53	163.73	84.97	10.11	2.53
BH-113	1.00	23.50	21.00	21.00	348.19	164.75	10.25	2.56	174.10	93.88	10.25	2.56
BH-113	1.00	25.00	22.50	22.50	368.76	180.80	10.38	2.59	184.47	102.79	10.38	2.59
BH-113	1.00	26.50	24.00	24.00	389.33	196.85	10.53	2.63	194.84	111.70	10.53	2.63
BH-113	1.00	28.00	25.50	25.50	409.69	212.89	10.72	2.68	205.00	120.61	10.72	2.68
BH-113	1.00	29.50	27.00	27.00	430.26	228.94	10.87	2.72	215.37	129.52	10.87	2.72
BH-113	1.00	30.00	27.50	27.50	437.11	234.29	11.00	2.75	218.82	132.49	11.00	2.75
BH-113	1.20	22.00	19.50	19.50	471.01	193.35	13.24	3.31	256.85	116.88	13.24	3.31
BH-113	1.20	23.50	21.00	21.00	498.97	215.30	13.42	3.36	272.57	130.26	13.42	3.36
BH-113	1.20	25.00	22.50	22.50	526.93	237.25	13.58	3.40	288.30	143.64	13.58	3.40
BH-113	1.20	26.50	24.00	24.00	554.89	259.19	13.79	3.45	304.02	157.02	13.79	3.45
BH-113	1.20	28.00	25.50	25.50	582.48	281.14	14.03	3.51	319.37	170.40	14.03	3.51
BH-113	1.20	29.50	27.00	27.00	610.44	303.09	14.23	3.56	335.09	183.78	14.23	3.56
BH-113	1.20	30.00	27.50	27.50	619.76	310.41	14.40	3.60	340.33	188.24	14.40	3.60
BH-114	1.00	22.00	19.50	16.50	306.55	137.96	10.30	2.58	146.76	77.11	10.30	2.58
BH-114	1.00	23.50	21.00	18.00	326.29	153.43	10.64	2.66	156.30	85.44	10.64	2.66

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-114	1.00	25.00	22.50	19.50	346.04	168.90	11.04	2.76	165.85	93.77	11.04	2.76
BH-114	1.00	26.50	24.00	21.00	365.41	184.38	11.38	2.85	175.03	102.10	11.38	2.85
BH-114	1.00	28.00	25.50	22.50	385.16	199.85	11.67	2.92	184.57	110.43	11.67	2.92
BH-114	1.00	29.50	27.00	24.00	404.90	215.32	11.91	2.98	194.12	118.76	11.91	2.98
BH-114	1.00	30.00	27.50	24.50	411.48	220.47	12.11	3.03	197.30	121.54	12.11	3.03
BH-114	1.20	22.00	19.50	16.50	446.27	180.72	13.39	3.35	237.04	107.69	13.39	3.35
BH-114	1.20	23.50	21.00	18.00	473.42	202.10	13.83	3.46	251.95	120.50	13.83	3.46
BH-114	1.20	25.00	22.50	19.50	500.57	223.48	14.35	3.59	266.86	133.32	14.35	3.59
BH-114	1.20	26.50	24.00	21.00	527.08	244.86	14.79	3.70	281.14	146.13	14.79	3.70
BH-114	1.20	28.00	25.50	22.50	554.24	266.24	15.16	3.79	296.05	158.94	15.16	3.79
BH-114	1.20	29.50	27.00	24.00	581.39	287.62	15.47	3.87	310.96	171.75	15.47	3.87
BH-114	1.20	30.00	27.50	24.50	590.44	294.75	15.74	3.93	315.93	176.03	15.74	3.93
BH-115	1.00	22.00	19.50	18.00	282.87	141.43	10.75	2.69	136.83	79.69	10.75	2.69
BH-115	1.00	23.50	21.00	19.50	301.81	156.13	10.84	2.71	146.25	87.73	10.84	2.71
BH-115	1.00	25.00	22.50	21.00	351.77	171.76	10.96	2.74	171.00	96.22	10.96	2.74
BH-115	1.00	26.50	24.00	22.50	371.74	187.40	11.10	2.78	180.77	104.71	11.10	2.78
BH-115	1.00	28.00	25.50	24.00	391.72	203.03	11.33	2.83	190.55	113.21	11.33	2.83
BH-115	1.00	29.50	27.00	25.50	411.69	218.66	11.52	2.88	200.32	121.70	11.52	2.88
BH-115	1.00	30.00	27.50	26.00	418.35	223.87	11.68	2.92	203.58	124.53	11.68	2.92
BH-115	1.20	22.00	19.50	18.00	402.51	184.24	13.99	3.50	213.38	110.16	13.99	3.50
BH-115	1.20	23.50	21.00	19.50	428.45	204.42	14.11	3.53	227.90	122.34	14.11	3.53
BH-115	1.20	25.00	22.50	21.00	504.83	225.87	14.26	3.56	270.42	135.22	14.26	3.56
BH-115	1.20	26.50	24.00	22.50	532.08	247.32	14.45	3.61	285.43	148.10	14.45	3.61
BH-115	1.20	28.00	25.50	24.00	559.33	268.77	14.74	3.69	300.44	160.98	14.74	3.69
BH-115	1.20	29.50	27.00	25.50	586.58	290.22	14.99	3.75	315.45	173.86	14.99	3.75

BH ID	Pile Dia	Total Depth of Pile	Effective Shaft Depth	Grip Length	CASE_1 GW at Encountered Level				CASE_2 GW at Ground Level			
					Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head)	Lateral Capacity (Free Head)
-	(m)	(m)	(m)	(m)	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne	Tonne
BH-115	1.20	30.00	27.50	26.00	595.66	297.37	15.19	3.80	320.45	178.16	15.19	3.80
BH-116	1.00	22.00	19.50	16.50	295.84	132.43	9.41	2.35	139.23	73.81	9.41	2.35
BH-116	1.00	23.50	21.00	18.00	315.19	147.63	9.74	2.44	148.38	81.86	9.74	2.44
BH-116	1.00	25.00	22.50	19.50	334.54	162.83	10.20	2.55	157.53	89.92	10.20	2.55
BH-116	1.00	26.50	24.00	21.00	353.89	178.02	10.59	2.65	166.69	97.97	10.59	2.65
BH-116	1.00	28.00	25.50	22.50	373.24	193.22	10.92	2.73	175.84	106.03	10.92	2.73
BH-116	1.00	29.50	27.00	24.00	392.59	208.41	11.20	2.80	184.99	114.08	11.20	2.80
BH-116	1.00	30.00	27.50	24.50	399.04	213.48	11.43	2.86	188.04	116.77	11.43	2.86
BH-116	1.20	22.00	19.50	16.50	425.80	172.27	12.22	3.06	220.38	101.91	12.22	3.06
BH-116	1.20	23.50	21.00	18.00	451.97	192.96	12.66	3.16	234.31	114.04	12.66	3.16
BH-116	1.20	25.00	22.50	19.50	478.14	213.66	13.26	3.31	248.24	126.17	13.26	3.31
BH-116	1.20	26.50	24.00	21.00	504.31	234.35	13.76	3.44	262.18	138.29	13.76	3.44
BH-116	1.20	28.00	25.50	22.50	530.48	255.04	14.18	3.55	276.11	150.42	14.18	3.55
BH-116	1.20	29.50	27.00	24.00	556.65	275.74	14.55	3.64	290.04	162.55	14.55	3.64
BH-116	1.20	30.00	27.50	24.50	565.37	282.64	14.84	3.71	294.68	166.59	14.84	3.71

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-111	-
Chainage	11+609	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	204.29	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-111	1.00	22.00	19.50	19.50	325.44	148.73	10.72	2.68
BH-111	1.00	23.50	21.00	21.00	345.67	164.55	10.88	2.72
BH-111	1.00	25.00	22.50	22.50	365.91	180.36	11.08	2.77
BH-111	1.00	26.50	24.00	24.00	386.14	196.18	11.26	2.81
BH-111	1.00	28.00	25.50	25.50	406.38	211.99	11.40	2.85
BH-111	1.00	29.50	27.00	27.00	426.61	227.80	11.52	2.88
BH-111	1.00	30.00	27.50	27.50	433.36	233.08	11.62	2.90

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	4.71	2.53	25.02	27.55	11.02	5.11
2	4.00	5.50	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	4.71	7.58	44.68	54.79	21.91	8.88
3	5.50	7.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	4.71	12.63	64.34	87.08	34.83	14.06
4	7.00	8.50	1.50	Granular	19.00	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	90.75	105.00	4.71	17.98	86.95	127.66	51.06	20.75
5	8.50	10.00	1.50	Granular	19.00	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	119.25	133.50	4.71	27.56	199.23	267.50	107.00	30.11
6	10.00	11.50	1.50	Granular	19.00	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	147.75	162.00	4.71	34.15	239.25	341.67	136.67	41.32
7	11.50	13.00	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	176.25	190.50	4.71	42.19	315.42	460.02	184.01	54.78
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	197.40	204.29	4.71	47.25	330.49	522.35	208.94	69.66
9	14.50	16.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	15.25	16.00	204.29	204.29	4.71	50.59	368.79	611.24	244.50	85.48
10	16.00	17.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	16.75	17.50	204.29	204.29	4.71	50.59	368.79	661.83	264.73	101.29
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	204.29	204.29	4.71	50.59	368.79	712.42	284.97	117.11
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	204.29	204.29	4.71	50.59	368.79	763.01	305.20	132.92
13	20.50	22.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	204.29	204.29	4.71	50.59	368.79	813.59	325.44	148.73
14	22.00	23.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	204.29	204.29	4.71	50.59	368.79	864.18	345.67	164.55
15	23.50	25.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	204.29	204.29	4.71	50.59	368.79	914.77	365.91	180.36
16	25.00	26.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	204.29	204.29	4.71	50.59	368.79	965.36	386.14	196.18
17	26.50	28.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	204.29	204.29	4.71	50.59	368.79	1015.95	406.38	211.99
18	28.00	29.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	204.29	204.29	4.71	50.59	368.79	1066.53	426.61	227.80
19	29.50	30.00	0.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	204.29	204.29	1.57	16.86	368.79	1083.40	433.36	233.08

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	0.74	2.05	1.84	6.89	6.19	0.187	0.746	10.72	2.68	36.90	16.59	25.72	6.43	88.56	39.82
2	22.50	24	2.96E+07	4.91E-02	3.49E+03	3.34	0.75	2.05	1.84	6.85	6.16	0.184	0.735	10.88	2.72	37.27	16.76	26.11	6.53	89.44	40.23
3	24.00	25	2.96E+07	4.91E-02	3.59E+03	3.32	0.75	2.05	1.84	6.81	6.13	0.180	0.722	11.08	2.77	37.74	16.98	26.60	6.65	90.57	40.74
4	25.50	26	2.96E+07	4.91E-02	3.68E+03	3.31	0.76	2.05	1.84	6.77	6.09	0.178	0.710	11.26	2.81	38.13	17.16	27.02	6.76	91.52	41.18
5	27.00	26	2.96E+07	4.91E-02	3.75E+03	3.29	0.76	2.05	1.84	6.75	6.07	0.175	0.702	11.40	2.85	38.45	17.30	27.36	6.84	92.29	41.53
6	28.50	27	2.96E+07	4.91E-02	3.82E+03	3.28	0.76	2.05	1.84	6.72	6.05	0.174	0.694	11.52	2.88	38.72	17.43	27.65	6.91	92.93	41.82
7	30.00	27	2.96E+07	4.91E-02	3.87E+03	3.27	0.76	2.05	1.84	6.70	6.03	0.172	0.689	11.62	2.90	38.93	17.52	27.88	6.97	93.43	42.05

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-111	-
Chainage	11+609	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	233.37	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	14.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-111	1.20	22.00	19.50	19.50	470.24	193.97	14.03	3.51
BH-111	1.20	23.50	21.00	21.00	497.98	215.76	14.24	3.56
BH-111	1.20	25.00	22.50	22.50	525.72	237.55	14.51	3.63
BH-111	1.20	26.50	24.00	24.00	553.46	259.34	14.74	3.68
BH-111	1.20	28.00	25.50	25.50	581.20	281.13	14.92	3.73
BH-111	1.20	29.50	27.00	27.00	608.93	302.93	15.08	3.77
BH-111	1.20	30.00	27.50	27.50	618.18	310.19	15.20	3.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	5.65	3.03	37.57	40.61	16.24	7.18
2	4.00	5.50	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	5.65	9.09	65.89	78.01	31.20	12.10
3	5.50	7.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	5.65	15.15	94.20	121.48	48.59	18.72
4	7.00	8.50	1.50	Granular	19.00	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	90.75	105.00	5.65	21.57	126.93	175.79	70.31	27.14
5	8.50	10.00	1.50	Granular	19.00	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	119.25	133.50	5.65	33.07	290.28	372.20	148.88	38.77
6	10.00	11.50	1.50	Granular	19.00	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	147.75	162.00	5.65	40.98	347.91	470.81	188.33	52.62
7	11.50	13.00	1.50	Granular	19.00	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	176.25	190.50	5.65	50.63	457.99	631.52	252.61	69.17
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	197.40	204.29	5.65	56.70	477.74	707.98	283.19	87.42
9	14.50	16.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	15.25	16.00	211.56	218.83	5.65	62.87	570.24	863.34	345.34	107.40
10	16.00	17.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	16.75	17.50	226.10	233.37	5.65	67.19	607.28	967.56	387.02	128.59
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	233.37	233.37	5.65	69.35	607.28	1036.91	414.76	150.38
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	233.37	233.37	5.65	69.35	607.28	1106.25	442.50	172.17
13	20.50	22.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	233.37	233.37	5.65	69.35	607.28	1175.60	470.24	193.97
14	22.00	23.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	233.37	233.37	5.65	69.35	607.28	1244.95	497.98	215.76
15	23.50	25.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	233.37	233.37	5.65	69.35	607.28	1314.29	525.72	237.55
16	25.00	26.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	233.37	233.37	5.65	69.35	607.28	1383.64	553.46	259.34
17	26.50	28.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	233.37	233.37	5.65	69.35	607.28	1452.99	581.20	281.13
18	28.00	29.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	233.37	233.37	5.65	69.35	607.28	1522.34	608.93	302.93
19	29.50	30.00	0.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	233.37	233.37	1.88	23.12	607.28	1545.45	618.18	310.19

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.40E+03	3.88	0.64	2.07	1.85	8.03	7.18	0.143	0.570	14.03	3.51	56.30	25.19	33.67	8.42	135.13	60.46
2	22.50	24	2.96E+07	1.02E-01	3.49E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.140	0.562	14.24	3.56	56.86	25.45	34.17	8.54	136.47	61.07
3	24.00	25	2.96E+07	1.02E-01	3.59E+03	3.84	0.65	2.07	1.85	7.94	7.11	0.138	0.551	14.51	3.63	57.58	25.77	34.82	8.70	138.18	61.85
4	25.50	26	2.96E+07	1.02E-01	3.68E+03	3.82	0.65	2.06	1.85	7.90	7.07	0.136	0.543	14.74	3.68	58.18	26.04	35.36	8.84	139.63	62.51
5	27.00	26	2.96E+07	1.02E-01	3.75E+03	3.81	0.66	2.06	1.85	7.86	7.04	0.134	0.536	14.92	3.73	58.66	26.27	35.81	8.95	140.79	63.04
6	28.50	27	2.96E+07	1.02E-01	3.82E+03	3.80	0.66	2.06	1.85	7.84	7.02	0.133	0.531	15.08	3.77	59.07	26.45	36.18	9.05	141.77	63.48
7	30.00	27	2.96E+07	1.02E-01	3.87E+03	3.79	0.66	2.06	1.85	7.82	7.00	0.132	0.526	15.20	3.80	59.39	26.60	36.47	9.12	142.53	63.83

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-112	-
Chainage	11+760	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	196.79	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Groundwater Level from OGL	14.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-112	1.00	22.00	19.50	13.50	268.55	122.87	10.17	2.54
BH-112	1.00	23.50	21.00	15.00	287.39	137.71	10.52	2.63
BH-112	1.00	25.00	22.50	16.50	321.52	153.00	11.02	2.76
BH-112	1.00	26.50	24.00	18.00	341.01	168.30	11.45	2.86
BH-112	1.00	28.00	25.50	19.50	360.50	183.59	11.80	2.95
BH-112	1.00	29.50	27.00	21.00	380.00	198.89	12.10	3.03
BH-112	1.00	30.00	27.50	21.50	386.49	203.98	12.35	3.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	17.75	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	89.81	103.13	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	116.44	129.75	4.71	24.99	143.24	168.23	67.29	17.99
6	10.00	11.50	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	143.06	156.38	4.71	30.70	170.93	226.62	90.65	28.24
7	11.50	13.00	1.50	Granular	17.75	0.09	25	-	10.00	10.88	1.00	-	12.25	13.00	169.69	183.00	4.71	35.02	163.93	254.64	101.86	39.69
8	13.00	14.50	1.50	Granular	9.19	0.09	25	-	10.00	10.88	1.00	-	13.75	14.50	189.90	196.79	4.71	39.19	172.39	302.28	120.91	52.31
9	14.50	16.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	15.25	16.00	196.79	196.79	4.71	43.86	245.49	419.24	167.70	66.24
10	16.00	17.50	1.50	Granular	8.49	0.04	27	-	13.80	15.50	1.00	-	16.75	17.50	196.79	196.79	4.71	43.86	245.11	462.72	185.09	80.17
11	17.50	19.00	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	18.25	19.00	196.79	196.79	4.71	43.86	245.11	506.58	202.63	94.10
12	19.00	20.50	1.50	Granular	9.69	0.11	27	-	13.80	15.50	1.00	-	19.75	20.50	196.79	196.79	4.71	43.86	245.76	551.09	220.43	108.03
13	20.50	22.00	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	21.25	22.00	196.79	196.79	4.71	47.11	318.94	671.37	268.55	122.87
14	22.00	23.50	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	22.75	23.50	196.79	196.79	4.71	47.11	318.94	718.48	287.39	137.71
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	196.79	196.79	4.71	48.73	355.53	803.80	321.52	153.00
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	196.79	196.79	4.71	48.73	355.53	852.53	341.01	168.30
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	196.79	196.79	4.71	48.73	355.53	901.26	360.50	183.59
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	196.79	196.79	4.71	48.73	355.53	949.99	380.00	198.89
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	196.79	196.79	1.57	16.24	355.53	966.23	386.49	203.98

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	4.91E-02	2.18E+03	3.67	2.31	1.91	1.80	7.01	6.60	0.197	0.786	10.17	2.54	35.64	16.79	24.42	6.10	85.54	40.30
2	22.50	16	2.96E+07	4.91E-02	2.30E+03	3.63	2.34	1.91	1.80	6.93	6.53	0.190	0.760	10.52	2.63	36.45	17.18	25.26	6.31	87.49	41.24
3	24.00	17	2.96E+07	4.91E-02	2.47E+03	3.58	2.37	1.91	1.80	6.82	6.43	0.181	0.726	11.02	2.76	37.60	17.73	26.46	6.61	90.23	42.55
4	25.50	18	2.96E+07	4.91E-02	2.62E+03	3.54	2.40	1.90	1.80	6.74	6.36	0.175	0.699	11.45	2.86	38.55	18.19	27.47	6.87	92.53	43.65
5	27.00	19	2.96E+07	4.91E-02	2.75E+03	3.50	2.43	1.90	1.80	6.67	6.29	0.170	0.678	11.80	2.95	39.34	18.56	28.32	7.08	94.42	44.55
6	28.50	20	2.96E+07	4.91E-02	2.86E+03	3.48	2.45	1.90	1.80	6.61	6.24	0.165	0.661	12.10	3.03	40.01	18.88	29.04	7.26	96.02	45.32
7	30.00	21	2.96E+07	4.91E-02	2.96E+03	3.45	2.46	1.90	1.80	6.57	6.20	0.162	0.648	12.35	3.09	40.56	19.15	29.64	7.41	97.33	45.95

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-112	-
Chainage	11+760	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	223.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Groundwater Level from OGL	14.10	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-112	1.20	22.00	19.50	13.50	389.51	161.38	13.27	3.32
BH-112	1.20	23.50	21.00	15.00	415.17	181.72	13.73	3.43
BH-112	1.20	25.00	22.50	16.50	465.66	202.68	14.39	3.60
BH-112	1.20	26.50	24.00	18.00	492.20	223.63	14.94	3.74
BH-112	1.20	28.00	25.50	19.50	518.75	244.59	15.41	3.85
BH-112	1.20	29.50	27.00	21.00	545.29	265.54	15.81	3.95
BH-112	1.20	30.00	27.50	21.50	554.14	272.53	16.13	4.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	17.75	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	89.81	103.13	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	116.44	129.75	5.65	29.99	208.67	238.65	95.46	24.23
6	10.00	11.50	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	143.06	156.38	5.65	36.84	248.53	315.36	126.15	36.92
7	11.50	13.00	1.50	Granular	17.75	0.09	25	-	10.00	10.88	1.00	-	12.25	13.00	169.69	183.00	5.65	42.02	238.08	346.93	138.77	51.06
8	13.00	14.50	1.50	Granular	9.19	0.09	25	-	10.00	10.88	1.00	-	13.75	14.50	189.90	196.79	5.65	47.02	249.28	405.16	162.06	66.60
9	14.50	16.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	15.25	16.00	203.69	210.58	5.65	54.47	379.21	589.56	235.82	84.23
10	16.00	17.50	1.50	Granular	8.49	0.04	27	-	13.80	15.50	1.00	-	16.75	17.50	216.95	223.32	5.65	58.02	400.97	669.34	267.74	102.85
11	17.50	19.00	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	18.25	19.00	223.32	223.32	5.65	59.72	400.97	729.07	291.63	121.95
12	19.00	20.50	1.50	Granular	9.69	0.11	27	-	13.80	15.50	1.00	-	19.75	20.50	223.32	223.32	5.65	59.72	402.10	789.92	315.97	141.05
13	20.50	22.00	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	21.25	22.00	223.32	223.32	5.65	64.15	521.82	973.78	389.51	161.38
14	22.00	23.50	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	22.75	23.50	223.32	223.32	5.65	64.15	521.82	1037.93	415.17	181.72
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	223.32	223.32	5.65	66.36	581.68	1164.15	465.66	202.68
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	223.32	223.32	5.65	66.36	581.68	1230.51	492.20	223.63
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	223.32	223.32	5.65	66.36	581.68	1296.87	518.75	244.59
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	223.32	223.32	5.65	66.36	581.68	1363.23	545.29	265.54
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	223.32	223.32	1.88	22.12	581.68	1385.35	554.14	272.53

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	1.02E-01	2.18E+03	4.25	2.00	1.92	1.80	8.18	7.66	0.151	0.603	13.27	3.32	54.25	25.43	31.85	7.96	130.21	61.02
2	22.50	16	2.96E+07	1.02E-01	2.30E+03	4.20	2.02	1.92	1.80	8.08	7.58	0.146	0.583	13.73	3.43	55.50	26.02	32.95	8.24	133.20	62.45
3	24.00	17	2.96E+07	1.02E-01	2.47E+03	4.14	2.05	1.92	1.80	7.96	7.47	0.139	0.556	14.39	3.60	57.26	26.86	34.53	8.63	137.42	64.47
4	25.50	18	2.96E+07	1.02E-01	2.62E+03	4.09	2.08	1.92	1.80	7.86	7.38	0.134	0.535	14.94	3.74	58.73	27.56	35.87	8.97	140.95	66.15
5	27.00	19	2.96E+07	1.02E-01	2.75E+03	4.05	2.10	1.92	1.80	7.78	7.31	0.130	0.519	15.41	3.85	59.94	28.14	36.98	9.24	143.85	67.54
6	28.50	20	2.96E+07	1.02E-01	2.86E+03	4.02	2.11	1.92	1.80	7.71	7.25	0.127	0.506	15.81	3.95	60.96	28.63	37.93	9.48	146.31	68.72
7	30.00	21	2.96E+07	1.02E-01	2.96E+03	4.00	2.13	1.92	1.80	7.66	7.20	0.124	0.496	16.13	4.03	61.80	29.03	38.72	9.68	148.33	69.68

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-113	-
Chainage	11+835	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	207.67	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-113	1.00	22.00	19.50	19.50	327.63	148.70	10.11	2.53
BH-113	1.00	23.50	21.00	21.00	348.19	164.75	10.25	2.56
BH-113	1.00	25.00	22.50	22.50	368.76	180.80	10.38	2.59
BH-113	1.00	26.50	24.00	24.00	389.33	196.85	10.53	2.63
BH-113	1.00	28.00	25.50	25.50	409.69	212.89	10.72	2.68
BH-113	1.00	29.50	27.00	27.00	430.26	228.94	10.87	2.72
BH-113	1.00	30.00	27.50	27.50	437.11	234.29	11.00	2.75

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	13.31	26.63	4.71	0.00	22.42	22.42	8.97	4.40
2	4.00	5.50	1.50	Granular	17.75	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	39.94	53.25	4.71	7.58	40.65	48.23	19.29	8.17
3	5.50	7.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	66.56	79.88	4.71	14.29	91.38	113.25	45.30	13.82
4	7.00	8.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	94.13	108.38	4.71	20.20	121.60	163.67	65.47	21.13
5	8.50	10.00	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	122.63	136.88	4.71	27.33	177.60	247.00	98.80	30.43
6	10.00	11.50	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	151.13	165.38	4.71	33.68	212.43	315.51	126.20	41.51
7	11.50	13.00	1.50	Granular	19.00	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	179.63	193.88	4.71	41.51	284.02	428.61	171.44	54.78
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	200.77	207.67	4.71	46.40	297.31	488.31	195.32	69.42
9	14.50	16.00	1.50	Granular	9.19	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	207.67	207.67	4.71	49.71	335.85	576.55	230.62	84.99
10	16.00	17.50	1.50	Granular	9.19	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	207.67	207.67	4.71	49.71	335.85	626.26	250.50	100.56
11	17.50	19.00	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	207.67	207.67	4.71	51.42	374.38	716.22	286.49	116.61
12	19.00	20.50	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	207.67	207.67	4.71	51.42	374.38	767.64	307.06	132.65
13	20.50	22.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	207.67	207.67	4.71	51.42	374.38	819.06	327.63	148.70
14	22.00	23.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	207.67	207.67	4.71	51.42	374.38	870.49	348.19	164.75
15	23.50	25.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	207.67	207.67	4.71	51.42	374.38	921.91	368.76	180.80
16	25.00	26.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	207.67	207.67	4.71	51.42	374.38	973.33	389.33	196.85
17	26.50	28.00	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	207.67	207.67	4.71	51.42	373.84	1024.22	409.69	212.89
18	28.00	29.50	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	207.67	207.67	4.71	51.42	373.84	1075.64	430.26	228.94
19	29.50	30.00	0.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	207.67	207.67	1.57	17.14	373.84	1092.78	437.11	234.29

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.10E+03	3.42	0.73	2.05	1.85	7.02	6.31	0.198	0.791	10.11	2.53	35.49	15.95	24.26	6.07	85.17	38.27
2	22.50	22	2.96E+07	4.91E-02	3.17E+03	3.40	0.73	2.05	1.85	6.99	6.28	0.195	0.780	10.25	2.56	35.82	16.10	24.60	6.15	85.97	38.64
3	24.00	23	2.96E+07	4.91E-02	3.23E+03	3.39	0.74	2.05	1.84	6.96	6.26	0.193	0.771	10.38	2.59	36.11	16.23	24.90	6.23	86.66	38.95
4	25.50	23	2.96E+07	4.91E-02	3.31E+03	3.38	0.74	2.05	1.84	6.93	6.23	0.190	0.760	10.53	2.63	36.47	16.40	25.27	6.32	87.52	39.35
5	27.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	0.74	2.05	1.84	6.89	6.19	0.187	0.747	10.72	2.68	36.89	16.59	25.72	6.43	88.55	39.82
6	28.50	24	2.96E+07	4.91E-02	3.48E+03	3.34	0.75	2.05	1.84	6.85	6.16	0.184	0.736	10.87	2.72	37.26	16.76	26.10	6.52	89.42	40.21
7	30.00	25	2.96E+07	4.91E-02	3.55E+03	3.33	0.75	2.05	1.84	6.83	6.14	0.182	0.727	11.00	2.75	37.54	16.89	26.40	6.60	90.11	40.53

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-113	-
Chainage	11+835	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	235.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-113	1.20	22.00	19.50	19.50	471.01	193.35	13.24	3.31
BH-113	1.20	23.50	21.00	21.00	498.97	215.30	13.42	3.36
BH-113	1.20	25.00	22.50	22.50	526.93	237.25	13.58	3.40
BH-113	1.20	26.50	24.00	24.00	554.89	259.19	13.79	3.45
BH-113	1.20	28.00	25.50	25.50	582.48	281.14	14.03	3.51
BH-113	1.20	29.50	27.00	27.00	610.44	303.09	14.23	3.56
BH-113	1.20	30.00	27.50	27.50	619.76	310.41	14.40	3.60

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.75	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	13.31	26.63	5.65	0.00	33.50	33.50	13.40	6.33
2	4.00	5.50	1.50	Granular	17.75	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	39.94	53.25	5.65	9.10	59.74	68.84	27.54	11.26
3	5.50	7.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	66.56	79.88	5.65	17.14	133.99	160.23	64.09	18.43
4	7.00	8.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	94.13	108.38	5.65	24.24	177.67	228.15	91.26	27.59
5	8.50	10.00	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	122.63	136.88	5.65	32.79	258.73	342.00	136.80	39.15
6	10.00	11.50	1.50	Granular	19.00	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	151.13	165.38	5.65	40.42	308.88	432.57	173.03	52.84
7	11.50	13.00	1.50	Granular	19.00	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	179.63	193.88	5.65	49.82	412.37	585.88	234.35	69.17
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	200.77	207.67	5.65	55.68	429.77	658.96	263.58	87.13
9	14.50	16.00	1.50	Granular	9.19	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	214.56	221.46	5.65	61.63	516.96	807.78	323.11	106.76
10	16.00	17.50	1.50	Granular	9.19	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	228.35	235.25	5.65	65.59	548.46	904.88	361.95	127.51
11	17.50	19.00	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	235.25	235.25	5.65	69.90	611.39	1037.71	415.08	149.45
12	19.00	20.50	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	235.25	235.25	5.65	69.90	611.39	1107.61	443.05	171.40
13	20.50	22.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	235.25	235.25	5.65	69.90	611.39	1177.52	471.01	193.35
14	22.00	23.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	235.25	235.25	5.65	69.90	611.39	1247.42	498.97	215.30
15	23.50	25.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	235.25	235.25	5.65	69.90	611.39	1317.33	526.93	237.25
16	25.00	26.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	235.25	235.25	5.65	69.90	611.39	1387.23	554.89	259.19
17	26.50	28.00	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	235.25	235.25	5.65	69.90	610.46	1456.20	582.48	281.14
18	28.00	29.50	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	235.25	235.25	5.65	69.90	610.46	1526.11	610.44	303.09
19	29.50	30.00	0.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	235.25	235.25	1.88	23.30	610.46	1549.41	619.76	310.41

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.10E+03	3.96	0.63	2.07	1.85	8.18	7.32	0.151	0.604	13.24	3.31	54.16	24.22	31.76	7.94	129.98	58.13
2	22.50	22	2.96E+07	1.02E-01	3.17E+03	3.94	0.63	2.07	1.85	8.15	7.29	0.149	0.596	13.42	3.36	54.67	24.45	32.21	8.05	131.20	58.68
3	24.00	23	2.96E+07	1.02E-01	3.23E+03	3.92	0.64	2.07	1.85	8.11	7.26	0.147	0.589	13.58	3.40	55.10	24.65	32.60	8.15	132.25	59.15
4	25.50	23	2.96E+07	1.02E-01	3.31E+03	3.91	0.64	2.07	1.85	8.07	7.22	0.145	0.580	13.79	3.45	55.65	24.90	33.08	8.27	133.56	59.75
5	27.00	24	2.96E+07	1.02E-01	3.40E+03	3.88	0.64	2.07	1.85	8.03	7.18	0.143	0.570	14.03	3.51	56.30	25.19	33.66	8.42	135.11	60.46
6	28.50	24	2.96E+07	1.02E-01	3.48E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.562	14.23	3.56	56.85	25.44	34.16	8.54	136.43	61.05
7	30.00	25	2.96E+07	1.02E-01	3.55E+03	3.85	0.65	2.07	1.85	7.96	7.12	0.139	0.556	14.40	3.60	57.28	25.64	34.55	8.64	137.48	61.53

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-114	-
Chainage	11+943	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	199.34	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-114	1.00	22.00	19.50	16.50	306.55	137.96	10.30	2.58
BH-114	1.00	23.50	21.00	18.00	326.29	153.43	10.64	2.66
BH-114	1.00	25.00	22.50	19.50	346.04	168.90	11.04	2.76
BH-114	1.00	26.50	24.00	21.00	365.41	184.38	11.38	2.85
BH-114	1.00	28.00	25.50	22.50	385.16	199.85	11.67	2.92
BH-114	1.00	29.50	27.00	24.00	404.90	215.32	11.91	2.98
BH-114	1.00	30.00	27.50	24.50	411.48	220.47	12.11	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.20	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	12.15	24.30	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	37.05	49.80	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	62.55	75.30	4.71	12.39	63.42	75.81	30.32	11.17
4	7.00	8.50	1.50	Granular	17.75	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	88.61	101.93	4.71	17.55	84.18	114.13	45.65	17.73
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	115.24	128.55	4.71	24.73	141.99	196.67	78.67	26.31
6	10.00	11.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	142.80	157.05	4.71	30.65	172.22	257.54	103.02	36.54
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	171.30	185.55	4.71	39.59	272.32	397.24	158.90	49.27
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	192.45	199.34	4.71	44.48	285.62	455.01	182.01	63.37
9	14.50	16.00	1.50	Granular	9.69	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	199.34	199.34	4.71	46.07	285.93	501.40	200.56	77.92
10	16.00	17.50	1.50	Granular	9.69	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	199.34	199.34	4.71	46.07	285.93	547.47	218.99	92.47
11	17.50	19.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	199.34	199.34	4.71	47.72	322.98	632.24	252.89	107.48
12	19.00	20.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	199.34	199.34	4.71	47.72	322.98	679.95	271.98	122.49
13	20.50	22.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	21.25	22.00	199.34	199.34	4.71	49.36	360.04	766.37	306.55	137.96
14	22.00	23.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	22.75	23.50	199.34	199.34	4.71	49.36	360.04	815.73	326.29	153.43
15	23.50	25.00	1.50	Granular	9.69	0.13	30	-	19.50	22.44	1.00	-	24.25	25.00	199.34	199.34	4.71	49.36	360.04	865.09	346.04	168.90
16	25.00	26.50	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	25.75	26.50	199.34	199.34	4.71	49.36	359.12	913.53	365.41	184.38
17	26.50	28.00	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	27.25	28.00	199.34	199.34	4.71	49.36	359.12	962.90	385.16	199.85
18	28.00	29.50	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	28.75	29.50	199.34	199.34	4.71	49.36	359.12	1012.26	404.90	215.32
19	29.50	30.00	0.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	29.75	30.00	199.34	199.34	1.57	16.45	359.12	1028.71	411.48	220.47

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.53E+03	3.56	1.54	1.96	1.82	6.98	6.47	0.194	0.776	10.30	2.58	35.94	16.66	24.73	6.18	86.27	39.99
2	22.50	19	2.96E+07	4.91E-02	2.66E+03	3.53	1.56	1.96	1.81	6.90	6.40	0.188	0.752	10.64	2.66	36.73	17.03	25.55	6.39	88.15	40.88
3	24.00	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.181	0.724	11.04	2.76	37.65	17.47	26.51	6.63	90.35	41.92
4	25.50	21	2.96E+07	4.91E-02	2.96E+03	3.45	1.59	1.95	1.81	6.75	6.26	0.176	0.703	11.38	2.85	38.41	17.83	27.32	6.83	92.20	42.79
5	27.00	22	2.96E+07	4.91E-02	3.07E+03	3.43	1.60	1.95	1.81	6.69	6.22	0.171	0.686	11.67	2.92	39.05	18.13	28.00	7.00	93.72	43.52
6	28.50	22	2.96E+07	4.91E-02	3.17E+03	3.40	1.62	1.95	1.81	6.65	6.17	0.168	0.672	11.91	2.98	39.59	18.39	28.59	7.15	95.02	44.13
7	30.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.660	12.11	3.03	40.04	18.60	29.07	7.27	96.09	44.64

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-114	-
Chainage	11+943	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	228.42	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	13.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-114	1.20	22.00	19.50	16.50	446.27	180.72	13.39	3.35
BH-114	1.20	23.50	21.00	18.00	473.42	202.10	13.83	3.46
BH-114	1.20	25.00	22.50	19.50	500.57	223.48	14.35	3.59
BH-114	1.20	26.50	24.00	21.00	527.08	244.86	14.79	3.70
BH-114	1.20	28.00	25.50	22.50	554.24	266.24	15.16	3.79
BH-114	1.20	29.50	27.00	24.00	581.39	287.62	15.47	3.87
BH-114	1.20	30.00	27.50	24.50	590.44	294.75	15.74	3.93

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	16.20	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	12.15	24.30	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	37.05	49.80	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	62.55	75.30	5.65	14.87	92.87	107.74	43.09	15.25
4	7.00	8.50	1.50	Granular	17.75	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	88.61	101.93	5.65	21.07	122.84	158.77	63.51	23.52
5	8.50	10.00	1.50	Granular	17.75	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	115.24	128.55	5.65	29.68	206.87	272.48	108.99	34.21
6	10.00	11.50	1.50	Granular	19.00	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	142.80	157.05	5.65	36.78	250.56	352.95	141.18	46.88
7	11.50	13.00	1.50	Granular	19.00	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	171.30	185.55	5.65	47.51	395.53	545.43	218.17	62.55
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	192.45	199.34	5.65	53.37	412.93	616.20	246.48	79.87
9	14.50	16.00	1.50	Granular	9.69	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	206.61	213.88	5.65	57.30	442.87	703.44	281.38	98.29
10	16.00	17.50	1.50	Granular	9.69	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	221.15	228.42	5.65	61.33	472.27	794.18	317.67	117.84
11	17.50	19.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	228.42	228.42	5.65	65.61	533.47	920.99	368.40	138.59
12	19.00	20.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	228.42	228.42	5.65	65.61	533.47	986.61	394.64	159.34
13	20.50	22.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	21.25	22.00	228.42	228.42	5.65	67.88	594.67	1115.68	446.27	180.72
14	22.00	23.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	22.75	23.50	228.42	228.42	5.65	67.88	594.67	1183.55	473.42	202.10
15	23.50	25.00	1.50	Granular	9.69	0.13	30	-	19.50	22.44	1.00	-	24.25	25.00	228.42	228.42	5.65	67.88	594.67	1251.43	500.57	223.48
16	25.00	26.50	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	25.75	26.50	228.42	228.42	5.65	67.88	593.07	1317.71	527.08	244.86
17	26.50	28.00	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	27.25	28.00	228.42	228.42	5.65	67.88	593.07	1385.59	554.24	266.24
18	28.00	29.50	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	28.75	29.50	228.42	228.42	5.65	67.88	593.07	1453.46	581.39	287.62
19	29.50	30.00	0.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	29.75	30.00	228.42	228.42	1.88	22.63	593.07	1476.09	590.44	294.75

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.53E+03	4.12	1.33	1.98	1.82	8.15	7.51	0.149	0.598	13.39	3.35	54.57	25.13	32.13	8.03	130.97	60.31
2	22.50	19	2.96E+07	1.02E-01	2.66E+03	4.08	1.35	1.98	1.82	8.07	7.43	0.145	0.579	13.83	3.46	55.76	25.69	33.19	8.30	133.83	61.66
3	24.00	20	2.96E+07	1.02E-01	2.82E+03	4.03	1.36	1.98	1.82	7.97	7.34	0.139	0.558	14.35	3.59	57.15	26.35	34.43	8.61	137.17	63.23
4	25.50	21	2.96E+07	1.02E-01	2.96E+03	4.00	1.38	1.97	1.82	7.89	7.27	0.135	0.541	14.79	3.70	58.32	26.89	35.50	8.87	139.97	64.55
5	27.00	22	2.96E+07	1.02E-01	3.07E+03	3.97	1.39	1.97	1.82	7.82	7.22	0.132	0.528	15.16	3.79	59.29	27.35	36.38	9.09	142.29	65.64
6	28.50	22	2.96E+07	1.02E-01	3.17E+03	3.94	1.40	1.97	1.82	7.77	7.17	0.129	0.517	15.47	3.87	60.11	27.74	37.14	9.28	144.26	66.57
7	30.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.40	1.97	1.82	7.73	7.13	0.127	0.508	15.74	3.93	60.78	28.06	37.77	9.44	145.88	67.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-115	-
Chainage	12+051	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	201.67	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-115	1.00	22.00	19.50	18.00	282.87	141.43	10.75	2.69
BH-115	1.00	23.50	21.00	19.50	301.81	156.13	10.84	2.71
BH-115	1.00	25.00	22.50	21.00	351.77	171.76	10.96	2.74
BH-115	1.00	26.50	24.00	22.50	371.74	187.40	11.10	2.78
BH-115	1.00	28.00	25.50	24.00	391.72	203.03	11.33	2.83
BH-115	1.00	29.50	27.00	25.50	411.69	218.66	11.52	2.88
BH-115	1.00	30.00	27.50	26.00	418.35	223.87	11.68	2.92

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.25	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	12.94	25.88	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.85	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	39.26	52.65	4.71	8.43	63.12	71.54	28.62	8.41
3	5.50	7.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	66.04	79.43	4.71	14.72	106.77	129.91	51.97	14.18
4	7.00	8.50	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	92.81	106.20	4.71	20.68	139.49	183.32	73.33	21.62
5	8.50	10.00	1.50	Granular	17.85	0.05	27	-	13.80	15.50	1.00	-	9.25	10.00	119.59	132.98	4.71	26.65	172.21	242.69	97.08	30.73
6	10.00	11.50	1.50	Granular	18.30	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	146.70	160.43	4.71	32.69	206.00	309.18	123.67	41.53
7	11.50	13.00	1.50	Granular	18.30	0.11	26	-	11.90	13.19	1.00	-	12.25	13.00	174.15	187.88	4.71	37.37	203.94	344.49	137.80	53.65
8	13.00	14.50	1.50	Granular	9.19	0.11	26	-	11.90	13.19	1.00	-	13.75	14.50	194.77	201.67	4.71	41.80	214.01	396.36	158.54	67.00
9	14.50	16.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	201.67	201.67	4.71	46.61	288.89	517.85	207.14	81.70
10	16.00	17.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	201.67	201.67	4.71	46.61	288.89	564.45	225.78	96.40
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	201.67	201.67	4.71	48.27	326.33	650.17	260.07	111.57
12	19.00	20.50	1.50	Granular	8.49	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	201.67	201.67	4.71	48.27	325.84	697.95	279.18	126.73
13	20.50	22.00	1.50	Granular	8.49	0.09	28	-	15.70	17.82	1.00	-	21.25	22.00	201.67	201.67	4.71	46.61	288.45	707.18	282.87	141.43
14	22.00	23.50	1.50	Granular	9.69	0.09	28	-	15.70	17.82	1.00	-	22.75	23.50	201.67	201.67	4.71	46.61	289.20	754.53	301.81	156.13
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	201.67	201.67	4.71	49.94	364.15	879.42	351.77	171.76
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	201.67	201.67	4.71	49.94	364.15	929.36	371.74	187.40
17	26.50	28.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	201.67	201.67	4.71	49.94	364.15	979.30	391.72	203.03
18	28.00	29.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	201.67	201.67	4.71	49.94	364.15	1029.23	411.69	218.66
19	29.50	30.00	0.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	201.67	201.67	1.57	16.65	364.15	1045.88	418.35	223.87

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.99E+03	3.44	1.16	2.00	1.83	6.88	6.30	0.186	0.744	10.75	2.69	36.98	16.93	25.81	6.45	88.75	40.62
2	22.50	21	2.96E+07	4.91E-02	3.03E+03	3.44	1.16	2.00	1.83	6.86	6.28	0.185	0.738	10.84	2.71	37.18	17.02	26.02	6.50	89.23	40.84
3	24.00	22	2.96E+07	4.91E-02	3.08E+03	3.42	1.17	2.00	1.83	6.83	6.26	0.183	0.730	10.96	2.74	37.45	17.14	26.30	6.57	89.87	41.15
4	25.50	22	2.96E+07	4.91E-02	3.15E+03	3.41	1.17	2.00	1.83	6.81	6.23	0.180	0.721	11.10	2.78	37.78	17.30	26.65	6.66	90.67	41.52
5	27.00	23	2.96E+07	4.91E-02	3.25E+03	3.39	1.18	1.99	1.83	6.76	6.19	0.177	0.706	11.33	2.83	38.29	17.54	27.19	6.80	91.89	42.09
6	28.50	23	2.96E+07	4.91E-02	3.33E+03	3.37	1.19	1.99	1.83	6.72	6.16	0.174	0.694	11.52	2.88	38.72	17.74	27.65	6.91	92.94	42.58
7	30.00	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.685	11.68	2.92	39.07	17.90	28.03	7.01	93.77	42.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-115	-
Chainage	12+051	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	229.25	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-115	1.20	22.00	19.50	18.00	402.51	184.24	13.99	3.50
BH-115	1.20	23.50	21.00	19.50	428.45	204.42	14.11	3.53
BH-115	1.20	25.00	22.50	21.00	504.83	225.87	14.26	3.56
BH-115	1.20	26.50	24.00	22.50	532.08	247.32	14.45	3.61
BH-115	1.20	28.00	25.50	24.00	559.33	268.77	14.74	3.69
BH-115	1.20	29.50	27.00	25.50	586.58	290.22	14.99	3.75
BH-115	1.20	30.00	27.50	26.00	595.66	297.37	15.19	3.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.25	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	12.94	25.88	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.85	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	39.26	52.65	5.65	10.11	93.30	103.41	41.37	11.54
3	5.50	7.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	66.04	79.43	5.65	17.66	156.55	184.32	73.73	18.86
4	7.00	8.50	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	92.81	106.20	5.65	24.82	203.66	256.26	102.50	28.18
5	8.50	10.00	1.50	Granular	17.85	0.05	27	-	13.80	15.50	1.00	-	9.25	10.00	119.59	132.98	5.65	31.98	250.78	335.36	134.14	39.52
6	10.00	11.50	1.50	Granular	18.30	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	146.70	160.43	5.65	39.23	299.51	423.32	169.33	52.88
7	11.50	13.00	1.50	Granular	18.30	0.11	26	-	11.90	13.19	1.00	-	12.25	13.00	174.15	187.88	5.65	44.85	296.15	464.80	185.92	67.81
8	13.00	14.50	1.50	Granular	9.19	0.11	26	-	11.90	13.19	1.00	-	13.75	14.50	194.77	201.67	5.65	50.16	309.41	528.23	211.29	84.23
9	14.50	16.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	208.56	215.46	5.65	57.84	445.52	722.18	288.87	102.80
10	16.00	17.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	222.35	229.25	5.65	61.67	473.41	811.74	324.69	122.44
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	229.25	229.25	5.65	65.85	534.76	938.94	375.57	143.25
12	19.00	20.50	1.50	Granular	8.49	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	229.25	229.25	5.65	65.85	533.92	1003.95	401.58	164.07
13	20.50	22.00	1.50	Granular	8.49	0.09	28	-	15.70	17.82	1.00	-	21.25	22.00	229.25	229.25	5.65	63.58	472.66	1006.27	402.51	184.24
14	22.00	23.50	1.50	Granular	9.69	0.09	28	-	15.70	17.82	1.00	-	22.75	23.50	229.25	229.25	5.65	63.58	473.94	1071.13	428.45	204.42
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	229.25	229.25	5.65	68.12	596.77	1262.08	504.83	225.87
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	229.25	229.25	5.65	68.12	596.77	1330.20	532.08	247.32
17	26.50	28.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	229.25	229.25	5.65	68.12	596.77	1398.32	559.33	268.77
18	28.00	29.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	229.25	229.25	5.65	68.12	596.77	1466.44	586.58	290.22
19	29.50	30.00	0.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	229.25	229.25	1.88	22.71	596.77	1489.15	595.66	297.37

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.99E+03	3.99	1.00	2.02	1.83	8.03	7.31	0.143	0.572	13.99	3.50	56.21	25.57	33.58	8.40	134.90	61.36
2	22.50	21	2.96E+07	1.02E-01	3.03E+03	3.98	1.01	2.02	1.83	8.01	7.29	0.142	0.567	14.11	3.53	56.51	25.71	33.86	8.46	135.63	61.70
3	24.00	22	2.96E+07	1.02E-01	3.08E+03	3.96	1.01	2.01	1.83	7.98	7.26	0.140	0.561	14.26	3.56	56.92	25.90	34.22	8.56	136.60	62.15
4	25.50	22	2.96E+07	1.02E-01	3.15E+03	3.95	1.01	2.01	1.83	7.95	7.23	0.138	0.554	14.45	3.61	57.42	26.13	34.68	8.67	137.81	62.71
5	27.00	23	2.96E+07	1.02E-01	3.25E+03	3.92	1.02	2.01	1.83	7.90	7.19	0.136	0.543	14.74	3.69	58.19	26.49	35.38	8.84	139.66	63.57
6	28.50	23	2.96E+07	1.02E-01	3.33E+03	3.90	1.03	2.01	1.83	7.85	7.15	0.133	0.534	14.99	3.75	58.85	26.79	35.98	9.00	141.24	64.31
7	30.00	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.82	7.12	0.132	0.527	15.19	3.80	59.38	27.04	36.47	9.12	142.51	64.89

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-116	-
Chainage	12+130	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	195.37	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-116	1.00	22.00	19.50	16.50	295.84	132.43	9.41	2.35
BH-116	1.00	23.50	21.00	18.00	315.19	147.63	9.74	2.44
BH-116	1.00	25.00	22.50	19.50	334.54	162.83	10.20	2.55
BH-116	1.00	26.50	24.00	21.00	353.89	178.02	10.59	2.65
BH-116	1.00	28.00	25.50	22.50	373.24	193.22	10.92	2.73
BH-116	1.00	29.50	27.00	24.00	392.59	208.41	11.20	2.80
BH-116	1.00	30.00	27.50	24.50	399.04	213.48	11.43	2.86

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	4.71	12.63	64.34	76.97	30.79	11.23
4	7.00	8.50	1.50	Granular	17.75	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	89.81	103.13	4.71	17.79	85.11	115.53	46.21	17.86
5	8.50	10.00	1.50	Granular	17.75	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	116.44	129.75	4.71	24.03	118.27	172.72	69.09	26.24
6	10.00	11.50	1.50	Granular	17.85	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	143.14	156.53	4.71	29.54	141.27	225.26	90.10	36.16
7	11.50	13.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	12.25	13.00	169.91	183.30	4.71	37.87	233.71	355.57	142.23	48.41
8	13.00	14.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	13.75	14.50	189.33	195.37	4.71	42.20	243.12	407.17	162.87	61.88
9	14.50	16.00	1.50	Granular	8.04	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	195.37	195.37	4.71	45.15	279.33	488.53	195.41	76.17
10	16.00	17.50	1.50	Granular	8.49	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	195.37	195.37	4.71	45.15	279.61	533.96	213.58	90.46
11	17.50	19.00	1.50	Granular	8.49	0.08	26	-	11.90	13.19	1.00	-	18.25	19.00	195.37	195.37	4.71	41.93	207.13	503.41	201.36	103.85
12	19.00	20.50	1.50	Granular	9.69	0.08	26	-	11.90	13.19	1.00	-	19.75	20.50	195.37	195.37	4.71	41.93	207.69	545.90	218.36	117.24
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	195.37	195.37	4.71	48.38	353.01	739.59	295.84	132.43
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	195.37	195.37	4.71	48.38	353.01	787.97	315.19	147.63
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	195.37	195.37	4.71	48.38	353.01	836.35	334.54	162.83
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	195.37	195.37	4.71	48.38	353.01	884.73	353.89	178.02
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	195.37	195.37	4.71	48.38	353.01	933.11	373.24	193.22
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	195.37	195.37	4.71	48.38	353.01	981.48	392.59	208.41
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	195.37	195.37	1.57	16.13	353.01	997.61	399.04	213.48

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.20E+03	3.66	1.50	1.96	1.82	7.19	6.66	0.213	0.850	9.41	2.35	33.83	15.66	22.58	5.65	81.20	37.59
2	22.50	16	2.96E+07	4.91E-02	2.32E+03	3.63	1.52	1.96	1.82	7.11	6.58	0.205	0.821	9.74	2.44	34.63	16.04	23.39	5.85	83.11	38.49
3	24.00	18	2.96E+07	4.91E-02	2.49E+03	3.57	1.54	1.96	1.82	7.00	6.49	0.196	0.784	10.20	2.55	35.71	16.55	24.49	6.12	85.71	39.72
4	25.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.56	1.96	1.82	6.91	6.41	0.189	0.755	10.59	2.65	36.62	16.98	25.43	6.36	87.88	40.75
5	27.00	20	2.96E+07	4.91E-02	2.77E+03	3.50	1.57	1.96	1.81	6.84	6.35	0.183	0.733	10.92	2.73	37.36	17.33	26.20	6.55	89.66	41.59
6	28.50	20	2.96E+07	4.91E-02	2.88E+03	3.47	1.58	1.95	1.81	6.79	6.30	0.179	0.714	11.20	2.80	37.99	17.63	26.87	6.72	91.18	42.31
7	30.00	21	2.96E+07	4.91E-02	2.97E+03	3.45	1.59	1.95	1.81	6.74	6.26	0.175	0.700	11.43	2.86	38.51	17.87	27.42	6.86	92.42	42.90

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-116	-
Chainage	12+130	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	220.17	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	14.20	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-116	1.20	22.00	19.50	16.50	425.80	172.27	12.22	3.06
BH-116	1.20	23.50	21.00	18.00	451.97	192.96	12.66	3.16
BH-116	1.20	25.00	22.50	19.50	478.14	213.66	13.26	3.31
BH-116	1.20	26.50	24.00	21.00	504.31	234.35	13.76	3.44
BH-116	1.20	28.00	25.50	22.50	530.48	255.04	14.18	3.55
BH-116	1.20	29.50	27.00	24.00	556.65	275.74	14.55	3.64
BH-116	1.20	30.00	27.50	24.50	565.37	282.64	14.84	3.71

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	12.75	25.50	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	38.25	51.00	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	17.00	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	63.75	76.50	5.65	15.15	94.20	109.35	43.74	15.33
4	7.00	8.50	1.50	Granular	17.75	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	89.81	103.13	5.65	21.35	124.17	160.68	64.27	23.68
5	8.50	10.00	1.50	Granular	17.75	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	116.44	129.75	5.65	28.83	172.32	237.66	95.06	34.13
6	10.00	11.50	1.50	Granular	17.85	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	143.14	156.53	5.65	35.44	205.45	306.24	122.49	46.43
7	11.50	13.00	1.50	Granular	17.85	0.03	27	-	13.80	15.50	1.00	-	12.25	13.00	169.91	183.30	5.65	45.44	339.34	485.57	194.23	61.53
8	13.00	14.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	13.75	14.50	189.33	195.37	5.65	50.63	351.36	548.22	219.29	78.08
9	14.50	16.00	1.50	Granular	8.04	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	201.40	207.43	5.65	55.86	428.06	680.78	272.31	96.09
10	16.00	17.50	1.50	Granular	8.49	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	213.80	220.17	5.65	59.30	454.31	766.32	306.53	115.07
11	17.50	19.00	1.50	Granular	8.49	0.08	26	-	11.90	13.19	1.00	-	18.25	19.00	220.17	220.17	5.65	56.70	336.56	705.27	282.11	133.32
12	19.00	20.50	1.50	Granular	9.69	0.08	26	-	11.90	13.19	1.00	-	19.75	20.50	220.17	220.17	5.65	56.70	337.53	762.94	305.18	151.57
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	220.17	220.17	5.65	65.42	573.65	1064.49	425.80	172.27
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	220.17	220.17	5.65	65.42	573.65	1129.92	451.97	192.96
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	220.17	220.17	5.65	65.42	573.65	1195.34	478.14	213.66
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	220.17	220.17	5.65	65.42	573.65	1260.77	504.31	234.35
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	220.17	220.17	5.65	65.42	573.65	1326.19	530.48	255.04
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	220.17	220.17	5.65	65.42	573.65	1391.62	556.65	275.74
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	220.17	220.17	1.88	21.81	573.65	1413.42	565.37	282.64

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.20E+03	4.24	1.30	1.98	1.82	8.40	7.73	0.164	0.654	12.22	3.06	51.37	23.62	29.34	7.33	123.28	56.70
2	22.50	16	2.96E+07	1.02E-01	2.32E+03	4.19	1.31	1.98	1.82	8.31	7.64	0.158	0.632	12.66	3.16	52.58	24.19	30.38	7.60	126.19	58.07
3	24.00	18	2.96E+07	1.02E-01	2.49E+03	4.13	1.33	1.98	1.82	8.18	7.53	0.151	0.603	13.26	3.31	54.22	24.96	31.82	7.95	130.12	59.91
4	25.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.35	1.98	1.82	8.08	7.44	0.145	0.581	13.76	3.44	55.59	25.61	33.03	8.26	133.41	61.46
5	27.00	20	2.96E+07	1.02E-01	2.77E+03	4.05	1.36	1.98	1.82	8.00	7.37	0.141	0.564	14.18	3.55	56.72	26.14	34.04	8.51	136.12	62.74
6	28.50	20	2.96E+07	1.02E-01	2.88E+03	4.02	1.37	1.97	1.82	7.93	7.31	0.137	0.550	14.55	3.64	57.68	26.59	34.91	8.73	138.43	63.82
7	30.00	21	2.96E+07	1.02E-01	2.97E+03	3.99	1.38	1.97	1.82	7.88	7.27	0.135	0.539	14.84	3.71	58.46	26.96	35.62	8.91	140.31	64.71

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-111	-
Chainage	11+609	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	101.32	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-111	1.00	22.00	19.50	19.50	159.65	83.68	10.72	2.68
BH-111	1.00	23.50	21.00	21.00	169.69	92.35	10.88	2.72
BH-111	1.00	25.00	22.50	22.50	179.72	101.03	11.08	2.77
BH-111	1.00	26.50	24.00	24.00	189.76	109.70	11.26	2.81
BH-111	1.00	28.00	25.50	25.50	199.79	118.38	11.40	2.85
BH-111	1.00	29.50	27.00	27.00	209.83	127.05	11.52	2.88
BH-111	1.00	30.00	27.50	27.50	213.17	129.94	11.62	2.90

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	4.71	1.07	10.59	11.66	4.66	4.70
2	4.00	5.50	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	4.71	3.21	18.91	23.18	9.27	7.24
3	5.50	7.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	4.71	5.34	27.23	36.85	14.74	10.39
4	7.00	8.50	1.50	Granular	9.19	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	39.27	46.16	4.71	7.78	38.49	55.89	22.35	14.22
5	8.50	10.00	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	53.06	59.95	4.71	12.26	89.88	119.54	47.81	19.30
6	10.00	11.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	66.85	73.74	4.71	15.45	109.24	154.35	61.74	25.28
7	11.50	13.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	80.64	87.53	4.71	19.30	145.25	209.66	83.86	32.33
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	94.43	101.32	4.71	22.60	167.13	254.14	101.66	40.31
9	14.50	16.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	15.25	16.00	101.32	101.32	4.71	25.09	186.66	298.77	119.51	48.98
10	16.00	17.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	16.75	17.50	101.32	101.32	4.71	25.09	186.66	323.86	129.54	57.66
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	101.32	101.32	4.71	25.09	186.66	348.95	139.58	66.33
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	101.32	101.32	4.71	25.09	186.66	374.04	149.61	75.01
13	20.50	22.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	101.32	101.32	4.71	25.09	186.66	399.12	159.65	83.68
14	22.00	23.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	101.32	101.32	4.71	25.09	186.66	424.21	169.69	92.35
15	23.50	25.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	101.32	101.32	4.71	25.09	186.66	449.30	179.72	101.03
16	25.00	26.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	101.32	101.32	4.71	25.09	186.66	474.39	189.76	109.70
17	26.50	28.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	101.32	101.32	4.71	25.09	186.66	499.48	199.79	118.38
18	28.00	29.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	101.32	101.32	4.71	25.09	186.66	524.57	209.83	127.05
19	29.50	30.00	0.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	101.32	101.32	1.57	8.36	186.66	532.94	213.17	129.94

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	0.74	2.05	1.84	6.89	6.19	0.187	0.746	10.72	2.68	36.90	16.59	25.72	6.43	88.56	39.82
2	22.50	24	2.96E+07	4.91E-02	3.49E+03	3.34	0.75	2.05	1.84	6.85	6.16	0.184	0.735	10.88	2.72	37.27	16.76	26.11	6.53	89.44	40.23
3	24.00	25	2.96E+07	4.91E-02	3.59E+03	3.32	0.75	2.05	1.84	6.81	6.13	0.180	0.722	11.08	2.77	37.74	16.98	26.60	6.65	90.57	40.74
4	25.50	26	2.96E+07	4.91E-02	3.68E+03	3.31	0.76	2.05	1.84	6.77	6.09	0.178	0.710	11.26	2.81	38.13	17.16	27.02	6.76	91.52	41.18
5	27.00	26	2.96E+07	4.91E-02	3.75E+03	3.29	0.76	2.05	1.84	6.75	6.07	0.175	0.702	11.40	2.85	38.45	17.30	27.36	6.84	92.29	41.53
6	28.50	27	2.96E+07	4.91E-02	3.82E+03	3.28	0.76	2.05	1.84	6.72	6.05	0.174	0.694	11.52	2.88	38.72	17.43	27.65	6.91	92.93	41.82
7	30.00	27	2.96E+07	4.91E-02	3.87E+03	3.27	0.76	2.05	1.84	6.70	6.03	0.172	0.689	11.62	2.90	38.93	17.52	27.88	6.97	93.43	42.05

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-111	-
Chainage	11+609	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	130.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-111	1.20	22.00	19.50	19.50	253.81	115.90	14.03	3.51
BH-111	1.20	23.50	21.00	21.00	269.31	129.12	14.24	3.56
BH-111	1.20	25.00	22.50	22.50	284.81	142.35	14.51	3.63
BH-111	1.20	26.50	24.00	24.00	300.31	155.57	14.74	3.68
BH-111	1.20	28.00	25.50	25.50	315.81	168.80	14.92	3.73
BH-111	1.20	29.50	27.00	27.00	331.31	182.02	15.08	3.77
BH-111	1.20	30.00	27.50	27.50	336.48	186.43	15.20	3.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	5.65	1.28	15.90	17.18	6.87	6.69
2	4.00	5.50	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	5.65	3.85	27.88	33.01	13.20	10.14
3	5.50	7.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	5.65	6.41	39.86	51.40	20.56	14.32
4	7.00	8.50	1.50	Granular	9.19	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	39.27	46.16	5.65	9.33	56.26	77.14	30.85	19.30
5	8.50	10.00	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	9.25	10.00	53.06	59.95	5.65	14.71	131.06	166.65	66.66	25.80
6	10.00	11.50	1.50	Granular	9.19	0.02	28	-	15.70	17.82	1.00	-	10.75	11.50	66.85	73.74	5.65	18.54	158.95	213.08	85.23	33.37
7	11.50	13.00	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	12.25	13.00	80.64	87.53	5.65	23.16	210.99	288.29	115.31	42.23
8	13.00	14.50	1.50	Granular	9.19	0.03	29	-	17.60	20.13	1.00	-	13.75	14.50	94.43	101.32	5.65	27.12	242.50	346.91	138.77	52.20
9	14.50	16.00	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	15.25	16.00	108.59	115.86	5.65	32.27	307.97	444.66	177.86	63.61
10	16.00	17.50	1.50	Granular	9.69	0.01	30	-	19.50	22.44	1.00	-	16.75	17.50	123.13	130.40	5.65	36.59	345.01	518.28	207.31	76.23
11	17.50	19.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	18.25	19.00	130.40	130.40	5.65	38.75	345.01	557.03	222.81	89.45
12	19.00	20.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	19.75	20.50	130.40	130.40	5.65	38.75	345.01	595.78	238.31	102.67
13	20.50	22.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	21.25	22.00	130.40	130.40	5.65	38.75	345.01	634.53	253.81	115.90
14	22.00	23.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	22.75	23.50	130.40	130.40	5.65	38.75	345.01	673.28	269.31	129.12
15	23.50	25.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	24.25	25.00	130.40	130.40	5.65	38.75	345.01	712.03	284.81	142.35
16	25.00	26.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	25.75	26.50	130.40	130.40	5.65	38.75	345.01	750.77	300.31	155.57
17	26.50	28.00	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	27.25	28.00	130.40	130.40	5.65	38.75	345.01	789.52	315.81	168.80
18	28.00	29.50	1.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	28.75	29.50	130.40	130.40	5.65	38.75	345.01	828.27	331.31	182.02
19	29.50	30.00	0.50	Granular	9.69	0.06	30	-	19.50	22.44	1.00	-	29.75	30.00	130.40	130.40	1.88	12.92	345.01	841.19	336.48	186.43

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	24	2.96E+07	1.02E-01	3.40E+03	3.88	0.64	2.07	1.85	8.03	7.18	0.143	0.570	14.03	3.51	56.30	25.19	33.67	8.42	135.13	60.46
2	22.50	24	2.96E+07	1.02E-01	3.49E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.140	0.562	14.24	3.56	56.86	25.45	34.17	8.54	136.47	61.07
3	24.00	25	2.96E+07	1.02E-01	3.59E+03	3.84	0.65	2.07	1.85	7.94	7.11	0.138	0.551	14.51	3.63	57.58	25.77	34.82	8.70	138.18	61.85
4	25.50	26	2.96E+07	1.02E-01	3.68E+03	3.82	0.65	2.06	1.85	7.90	7.07	0.136	0.543	14.74	3.68	58.18	26.04	35.36	8.84	139.63	62.51
5	27.00	26	2.96E+07	1.02E-01	3.75E+03	3.81	0.66	2.06	1.85	7.86	7.04	0.134	0.536	14.92	3.73	58.66	26.27	35.81	8.95	140.79	63.04
6	28.50	27	2.96E+07	1.02E-01	3.82E+03	3.80	0.66	2.06	1.85	7.84	7.02	0.133	0.531	15.08	3.77	59.07	26.45	36.18	9.05	141.77	63.48
7	30.00	27	2.96E+07	1.02E-01	3.87E+03	3.79	0.66	2.06	1.85	7.82	7.00	0.132	0.526	15.20	3.80	59.39	26.60	36.47	9.12	142.53	63.83

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-112	-
Chainage	11+760	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	93.82	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-112	1.00	22.00	19.50	13.50	127.61	69.95	10.17	2.54
BH-112	1.00	23.50	21.00	15.00	136.59	77.89	10.52	2.63
BH-112	1.00	25.00	22.50	16.50	153.01	86.05	11.02	2.76
BH-112	1.00	26.50	24.00	18.00	162.30	94.20	11.45	2.86
BH-112	1.00	28.00	25.50	19.50	171.60	102.35	11.80	2.95
BH-112	1.00	29.50	27.00	21.00	180.89	110.51	12.10	3.03
BH-112	1.00	30.00	27.50	21.50	183.99	113.23	12.35	3.09

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	4.71	0.00	0.00	0.00	0.00	7.70
4	7.00	8.50	1.50	Granular	7.94	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	38.33	44.29	4.71	0.00	0.00	0.00	0.00	9.35
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	50.24	56.20	4.71	10.78	62.16	72.95	29.18	14.01
6	10.00	11.50	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	62.16	68.12	4.71	13.34	74.55	98.68	39.47	19.40
7	11.50	13.00	1.50	Granular	7.94	0.09	25	-	10.00	10.88	1.00	-	12.25	13.00	74.07	80.03	4.71	15.29	71.76	111.17	44.47	25.33
8	13.00	14.50	1.50	Granular	9.19	0.09	25	-	10.00	10.88	1.00	-	13.75	14.50	86.93	93.82	4.71	17.94	84.08	141.43	56.57	32.00
9	14.50	16.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	15.25	16.00	93.82	93.82	4.71	20.91	119.65	197.91	79.16	39.50
10	16.00	17.50	1.50	Granular	8.49	0.04	27	-	13.80	15.50	1.00	-	16.75	17.50	93.82	93.82	4.71	20.91	119.27	218.44	87.38	47.01
11	17.50	19.00	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	18.25	19.00	93.82	93.82	4.71	20.91	119.27	239.35	95.74	54.51
12	19.00	20.50	1.50	Granular	9.69	0.11	27	-	13.80	15.50	1.00	-	19.75	20.50	93.82	93.82	4.71	20.91	119.93	260.91	104.36	62.02
13	20.50	22.00	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	21.25	22.00	93.82	93.82	4.71	22.46	155.57	319.01	127.61	69.95
14	22.00	23.50	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	22.75	23.50	93.82	93.82	4.71	22.46	155.57	341.47	136.59	77.89
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	93.82	93.82	4.71	23.23	173.40	382.53	153.01	86.05
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	93.82	93.82	4.71	23.23	173.40	405.76	162.30	94.20
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	93.82	93.82	4.71	23.23	173.40	428.99	171.60	102.35
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	93.82	93.82	4.71	23.23	173.40	452.23	180.89	110.51
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	93.82	93.82	1.57	7.74	173.40	459.97	183.99	113.23

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	4.91E-02	2.18E+03	3.67	2.31	1.91	1.80	7.01	6.60	0.197	0.786	10.17	2.54	35.64	16.79	24.42	6.10	85.54	40.30
2	22.50	16	2.96E+07	4.91E-02	2.30E+03	3.63	2.34	1.91	1.80	6.93	6.53	0.190	0.760	10.52	2.63	36.45	17.18	25.26	6.31	87.49	41.24
3	24.00	17	2.96E+07	4.91E-02	2.47E+03	3.58	2.37	1.91	1.80	6.82	6.43	0.181	0.726	11.02	2.76	37.60	17.73	26.46	6.61	90.23	42.55
4	25.50	18	2.96E+07	4.91E-02	2.62E+03	3.54	2.40	1.90	1.80	6.74	6.36	0.175	0.699	11.45	2.86	38.55	18.19	27.47	6.87	92.53	43.65
5	27.00	19	2.96E+07	4.91E-02	2.75E+03	3.50	2.43	1.90	1.80	6.67	6.29	0.170	0.678	11.80	2.95	39.34	18.56	28.32	7.08	94.42	44.55
6	28.50	20	2.96E+07	4.91E-02	2.86E+03	3.48	2.45	1.90	1.80	6.61	6.24	0.165	0.661	12.10	3.03	40.01	18.88	29.04	7.26	96.02	45.32
7	30.00	21	2.96E+07	4.91E-02	2.96E+03	3.45	2.46	1.90	1.80	6.57	6.20	0.162	0.648	12.35	3.09	40.56	19.15	29.64	7.41	97.33	45.95

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-112	-
Chainage	11+760	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	120.35	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	8.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-112	1.20	22.00	19.50	13.50	204.70	97.88	13.27	3.32
BH-112	1.20	23.50	21.00	15.00	218.53	109.94	13.73	3.43
BH-112	1.20	25.00	22.50	16.50	245.97	122.33	14.39	3.60
BH-112	1.20	26.50	24.00	18.00	260.27	134.71	14.94	3.74
BH-112	1.20	28.00	25.50	19.50	274.58	147.10	15.41	3.85
BH-112	1.20	29.50	27.00	21.00	288.88	159.49	15.81	3.95
BH-112	1.20	30.00	27.50	21.50	293.65	163.62	16.13	4.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	5.65	0.00	0.00	0.00	0.00	11.08
4	7.00	8.50	1.50	Granular	7.94	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	38.33	44.29	5.65	0.00	0.00	0.00	0.00	13.46
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	50.24	56.20	5.65	12.94	90.59	103.53	41.41	19.46
6	10.00	11.50	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	62.16	68.12	5.65	16.01	108.43	137.38	54.95	26.31
7	11.50	13.00	1.50	Granular	7.94	0.09	25	-	10.00	10.88	1.00	-	12.25	13.00	74.07	80.03	5.65	18.34	104.24	151.53	60.61	33.82
8	13.00	14.50	1.50	Granular	9.19	0.09	25	-	10.00	10.88	1.00	-	13.75	14.50	86.93	93.82	5.65	21.53	122.12	190.94	76.37	42.23
9	14.50	16.00	1.50	Granular	9.19	0.04	27	-	13.80	15.50	1.00	-	15.25	16.00	100.72	107.61	5.65	26.94	198.01	293.76	117.50	52.14
10	16.00	17.50	1.50	Granular	8.49	0.04	27	-	13.80	15.50	1.00	-	16.75	17.50	113.98	120.35	5.65	30.48	219.77	346.00	138.40	63.05
11	17.50	19.00	1.50	Granular	8.49	0.11	27	-	13.80	15.50	1.00	-	18.25	19.00	120.35	120.35	5.65	32.19	219.77	378.19	151.28	74.44
12	19.00	20.50	1.50	Granular	9.69	0.11	27	-	13.80	15.50	1.00	-	19.75	20.50	120.35	120.35	5.65	32.19	220.90	411.50	164.60	85.83
13	20.50	22.00	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	21.25	22.00	120.35	120.35	5.65	34.57	286.57	511.75	204.70	97.88
14	22.00	23.50	1.50	Granular	9.69	0.04	29	-	17.60	20.13	1.00	-	22.75	23.50	120.35	120.35	5.65	34.57	286.57	546.32	218.53	109.94
15	23.50	25.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	120.35	120.35	5.65	35.76	319.41	614.92	245.97	122.33
16	25.00	26.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	120.35	120.35	5.65	35.76	319.41	650.68	260.27	134.71
17	26.50	28.00	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	120.35	120.35	5.65	35.76	319.41	686.44	274.58	147.10
18	28.00	29.50	1.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	120.35	120.35	5.65	35.76	319.41	722.21	288.88	159.49
19	29.50	30.00	0.50	Granular	9.69	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	120.35	120.35	1.88	11.92	319.41	734.13	293.65	163.62

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	15	2.96E+07	1.02E-01	2.18E+03	4.25	2.00	1.92	1.80	8.18	7.66	0.151	0.603	13.27	3.32	54.25	25.43	31.85	7.96	130.21	61.02
2	22.50	16	2.96E+07	1.02E-01	2.30E+03	4.20	2.02	1.92	1.80	8.08	7.58	0.146	0.583	13.73	3.43	55.50	26.02	32.95	8.24	133.20	62.45
3	24.00	17	2.96E+07	1.02E-01	2.47E+03	4.14	2.05	1.92	1.80	7.96	7.47	0.139	0.556	14.39	3.60	57.26	26.86	34.53	8.63	137.42	64.47
4	25.50	18	2.96E+07	1.02E-01	2.62E+03	4.09	2.08	1.92	1.80	7.86	7.38	0.134	0.535	14.94	3.74	58.73	27.56	35.87	8.97	140.95	66.15
5	27.00	19	2.96E+07	1.02E-01	2.75E+03	4.05	2.10	1.92	1.80	7.78	7.31	0.130	0.519	15.41	3.85	59.94	28.14	36.98	9.24	143.85	67.54
6	28.50	20	2.96E+07	1.02E-01	2.86E+03	4.02	2.11	1.92	1.80	7.71	7.25	0.127	0.506	15.81	3.95	60.96	28.63	37.93	9.48	146.31	68.72
7	30.00	21	2.96E+07	1.02E-01	2.96E+03	4.00	2.13	1.92	1.80	7.66	7.20	0.124	0.496	16.13	4.03	61.80	29.03	38.72	9.68	148.33	69.68

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-113	-
Chainage	11+835	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	104.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-113	1.00	22.00	19.50	19.50	163.73	84.97	10.11	2.53
BH-113	1.00	23.50	21.00	21.00	174.10	93.88	10.25	2.56
BH-113	1.00	25.00	22.50	22.50	184.47	102.79	10.38	2.59
BH-113	1.00	26.50	24.00	24.00	194.84	111.70	10.53	2.63
BH-113	1.00	28.00	25.50	25.50	205.00	120.61	10.72	2.68
BH-113	1.00	29.50	27.00	27.00	215.37	129.52	10.87	2.72
BH-113	1.00	30.00	27.50	27.50	218.82	132.49	11.00	2.75

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	5.96	11.92	4.71	0.00	10.03	10.03	4.01	4.40
2	4.00	5.50	1.50	Granular	7.94	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	17.87	23.83	4.71	3.39	18.19	21.58	8.63	7.00
3	5.50	7.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	29.79	35.75	4.71	6.39	40.89	50.68	20.27	10.44
4	7.00	8.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	42.64	49.54	4.71	9.15	55.82	74.76	29.90	14.65
5	8.50	10.00	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	56.43	63.33	4.71	12.58	82.39	113.90	45.56	19.82
6	10.00	11.50	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	70.22	77.12	4.71	15.65	99.24	146.40	58.56	25.85
7	11.50	13.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	84.01	90.91	4.71	19.42	133.35	199.93	79.97	32.94
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	97.80	104.70	4.71	22.60	152.71	241.90	96.76	40.91
9	14.50	16.00	1.50	Granular	9.19	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	104.70	104.70	4.71	25.06	172.48	286.72	114.69	49.58
10	16.00	17.50	1.50	Granular	9.19	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	104.70	104.70	4.71	25.06	172.48	311.79	124.71	58.25
11	17.50	19.00	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	104.70	104.70	4.71	25.93	192.25	357.48	142.99	67.16
12	19.00	20.50	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	104.70	104.70	4.71	25.93	192.25	383.40	153.36	76.06
13	20.50	22.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	104.70	104.70	4.71	25.93	192.25	409.33	163.73	84.97
14	22.00	23.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	104.70	104.70	4.71	25.93	192.25	435.26	174.10	93.88
15	23.50	25.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	104.70	104.70	4.71	25.93	192.25	461.18	184.47	102.79
16	25.00	26.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	104.70	104.70	4.71	25.93	192.25	487.11	194.84	111.70
17	26.50	28.00	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	104.70	104.70	4.71	25.93	191.71	512.49	205.00	120.61
18	28.00	29.50	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	104.70	104.70	4.71	25.93	191.71	538.42	215.37	129.52
19	29.50	30.00	0.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	104.70	104.70	1.57	8.64	191.71	547.06	218.82	132.49

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	4.91E-02	3.10E+03	3.42	0.73	2.05	1.85	7.02	6.31	0.198	0.791	10.11	2.53	35.49	15.95	24.26	6.07	85.17	38.27
2	22.50	22	2.96E+07	4.91E-02	3.17E+03	3.40	0.73	2.05	1.85	6.99	6.28	0.195	0.780	10.25	2.56	35.82	16.10	24.60	6.15	85.97	38.64
3	24.00	23	2.96E+07	4.91E-02	3.23E+03	3.39	0.74	2.05	1.84	6.96	6.26	0.193	0.771	10.38	2.59	36.11	16.23	24.90	6.23	86.66	38.95
4	25.50	23	2.96E+07	4.91E-02	3.31E+03	3.38	0.74	2.05	1.84	6.93	6.23	0.190	0.760	10.53	2.63	36.47	16.40	25.27	6.32	87.52	39.35
5	27.00	24	2.96E+07	4.91E-02	3.40E+03	3.36	0.74	2.05	1.84	6.89	6.19	0.187	0.747	10.72	2.68	36.89	16.59	25.72	6.43	88.55	39.82
6	28.50	24	2.96E+07	4.91E-02	3.48E+03	3.34	0.75	2.05	1.84	6.85	6.16	0.184	0.736	10.87	2.72	37.26	16.76	26.10	6.52	89.42	40.21
7	30.00	25	2.96E+07	4.91E-02	3.55E+03	3.33	0.75	2.05	1.84	6.83	6.14	0.182	0.727	11.00	2.75	37.54	16.89	26.40	6.60	90.11	40.53

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-113	-
Chainage	11+835	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	132.28	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	2.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-113	1.20	22.00	19.50	19.50	256.85	116.88	13.24	3.31
BH-113	1.20	23.50	21.00	21.00	272.57	130.26	13.42	3.36
BH-113	1.20	25.00	22.50	22.50	288.30	143.64	13.58	3.40
BH-113	1.20	26.50	24.00	24.00	304.02	157.02	13.79	3.45
BH-113	1.20	28.00	25.50	25.50	319.37	170.40	14.03	3.51
BH-113	1.20	29.50	27.00	27.00	335.09	183.78	14.23	3.56
BH-113	1.20	30.00	27.50	27.50	340.33	188.24	14.40	3.60

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.94	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	5.96	11.92	5.65	0.00	14.99	14.99	6.00	6.33
2	4.00	5.50	1.50	Granular	7.94	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	17.87	23.83	5.65	4.07	26.73	30.81	12.32	9.85
3	5.50	7.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	6.25	7.00	29.79	35.75	5.65	7.67	59.96	71.70	28.68	14.37
4	7.00	8.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	7.75	8.50	42.64	49.54	5.65	10.98	81.62	104.35	41.74	19.82
5	8.50	10.00	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	9.25	10.00	56.43	63.33	5.65	15.09	120.08	157.89	63.16	26.42
6	10.00	11.50	1.50	Granular	9.19	0.02	27	-	13.80	15.50	1.00	-	10.75	11.50	70.22	77.12	5.65	18.78	144.35	200.94	80.38	34.06
7	11.50	13.00	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	12.25	13.00	84.01	90.91	5.65	23.30	193.66	273.55	109.42	42.95
8	13.00	14.50	1.50	Granular	9.19	0.00	28	-	15.70	17.82	1.00	-	13.75	14.50	97.80	104.70	5.65	27.12	221.54	328.56	131.43	52.92
9	14.50	16.00	1.50	Granular	9.19	0.01	29	-	17.60	20.13	1.00	-	15.25	16.00	111.59	118.49	5.65	32.05	281.71	420.79	168.31	64.27
10	16.00	17.50	1.50	Granular	9.19	0.01	29	-	17.60	20.13	1.00	-	16.75	17.50	125.38	132.28	5.65	36.02	313.22	488.31	195.32	76.73
11	17.50	19.00	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	18.25	19.00	132.28	132.28	5.65	39.31	349.12	563.51	225.41	90.11
12	19.00	20.50	1.50	Granular	9.19	0.02	30	-	19.50	22.44	1.00	-	19.75	20.50	132.28	132.28	5.65	39.31	349.12	602.82	241.13	103.50
13	20.50	22.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	21.25	22.00	132.28	132.28	5.65	39.31	349.12	642.13	256.85	116.88
14	22.00	23.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	22.75	23.50	132.28	132.28	5.65	39.31	349.12	681.43	272.57	130.26
15	23.50	25.00	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	24.25	25.00	132.28	132.28	5.65	39.31	349.12	720.74	288.30	143.64
16	25.00	26.50	1.50	Granular	9.19	0.00	30	-	19.50	22.44	1.00	-	25.75	26.50	132.28	132.28	5.65	39.31	349.12	760.04	304.02	157.02
17	26.50	28.00	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	27.25	28.00	132.28	132.28	5.65	39.31	348.19	798.42	319.37	170.40
18	28.00	29.50	1.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	28.75	29.50	132.28	132.28	5.65	39.31	348.19	837.73	335.09	183.78
19	29.50	30.00	0.50	Granular	8.49	0.00	30	-	19.50	22.44	1.00	-	29.75	30.00	132.28	132.28	1.88	13.10	348.19	850.83	340.33	188.24

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	22	2.96E+07	1.02E-01	3.10E+03	3.96	0.63	2.07	1.85	8.18	7.32	0.151	0.604	13.24	3.31	54.16	24.22	31.76	7.94	129.98	58.13
2	22.50	22	2.96E+07	1.02E-01	3.17E+03	3.94	0.63	2.07	1.85	8.15	7.29	0.149	0.596	13.42	3.36	54.67	24.45	32.21	8.05	131.20	58.68
3	24.00	23	2.96E+07	1.02E-01	3.23E+03	3.92	0.64	2.07	1.85	8.11	7.26	0.147	0.589	13.58	3.40	55.10	24.65	32.60	8.15	132.25	59.15
4	25.50	23	2.96E+07	1.02E-01	3.31E+03	3.91	0.64	2.07	1.85	8.07	7.22	0.145	0.580	13.79	3.45	55.65	24.90	33.08	8.27	133.56	59.75
5	27.00	24	2.96E+07	1.02E-01	3.40E+03	3.88	0.64	2.07	1.85	8.03	7.18	0.143	0.570	14.03	3.51	56.30	25.19	33.66	8.42	135.11	60.46
6	28.50	24	2.96E+07	1.02E-01	3.48E+03	3.87	0.65	2.07	1.85	7.99	7.15	0.141	0.562	14.23	3.56	56.85	25.44	34.16	8.54	136.43	61.05
7	30.00	25	2.96E+07	1.02E-01	3.55E+03	3.85	0.65	2.07	1.85	7.96	7.12	0.139	0.556	14.40	3.60	57.28	25.64	34.55	8.64	137.48	61.53

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-114	-
Chainage	11+943	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	96.37	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-114	1.00	22.00	19.50	16.50	146.76	77.11	10.30	2.58
BH-114	1.00	23.50	21.00	18.00	156.30	85.44	10.64	2.66
BH-114	1.00	25.00	22.50	19.50	165.85	93.77	11.04	2.76
BH-114	1.00	26.50	24.00	21.00	175.03	102.10	11.38	2.85
BH-114	1.00	28.00	25.50	22.50	184.57	110.43	11.67	2.92
BH-114	1.00	29.50	27.00	24.00	194.12	118.76	11.91	2.98
BH-114	1.00	30.00	27.50	24.50	197.30	121.54	12.11	3.03

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.39	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	4.80	9.59	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	14.99	20.38	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	25.78	31.17	4.71	5.11	26.30	31.41	12.56	9.13
4	7.00	8.50	1.50	Granular	7.94	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	37.13	43.09	4.71	7.36	35.72	48.19	19.27	12.84
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	49.04	55.00	4.71	10.53	60.92	83.90	33.56	17.43
6	10.00	11.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	61.90	68.79	4.71	13.28	75.84	112.11	44.84	22.80
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	75.69	82.58	4.71	17.49	121.66	175.42	70.17	29.35
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	89.48	96.37	4.71	20.68	141.02	215.46	86.19	36.79
9	14.50	16.00	1.50	Granular	9.69	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	96.37	96.37	4.71	22.27	141.33	238.05	95.22	44.67
10	16.00	17.50	1.50	Granular	9.69	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	96.37	96.37	4.71	22.27	141.33	260.32	104.13	52.56
11	17.50	19.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	96.37	96.37	4.71	23.07	159.62	301.68	120.67	60.67
12	19.00	20.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	96.37	96.37	4.71	23.07	159.62	324.74	129.90	68.78
13	20.50	22.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	21.25	22.00	96.37	96.37	4.71	23.86	177.91	366.90	146.76	77.11
14	22.00	23.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	22.75	23.50	96.37	96.37	4.71	23.86	177.91	390.76	156.30	85.44
15	23.50	25.00	1.50	Granular	9.69	0.13	30	-	19.50	22.44	1.00	-	24.25	25.00	96.37	96.37	4.71	23.86	177.91	414.62	165.85	93.77
16	25.00	26.50	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	25.75	26.50	96.37	96.37	4.71	23.86	176.98	437.57	175.03	102.10
17	26.50	28.00	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	27.25	28.00	96.37	96.37	4.71	23.86	176.98	461.43	184.57	110.43
18	28.00	29.50	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	28.75	29.50	96.37	96.37	4.71	23.86	176.98	485.29	194.12	118.76
19	29.50	30.00	0.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	29.75	30.00	96.37	96.37	1.57	7.95	176.98	493.25	197.30	121.54

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	4.91E-02	2.53E+03	3.56	1.54	1.96	1.82	6.98	6.47	0.194	0.776	10.30	2.58	35.94	16.66	24.73	6.18	86.27	39.99
2	22.50	19	2.96E+07	4.91E-02	2.66E+03	3.53	1.56	1.96	1.81	6.90	6.40	0.188	0.752	10.64	2.66	36.73	17.03	25.55	6.39	88.15	40.88
3	24.00	20	2.96E+07	4.91E-02	2.82E+03	3.49	1.58	1.96	1.81	6.82	6.33	0.181	0.724	11.04	2.76	37.65	17.47	26.51	6.63	90.35	41.92
4	25.50	21	2.96E+07	4.91E-02	2.96E+03	3.45	1.59	1.95	1.81	6.75	6.26	0.176	0.703	11.38	2.85	38.41	17.83	27.32	6.83	92.20	42.79
5	27.00	22	2.96E+07	4.91E-02	3.07E+03	3.43	1.60	1.95	1.81	6.69	6.22	0.171	0.686	11.67	2.92	39.05	18.13	28.00	7.00	93.72	43.52
6	28.50	22	2.96E+07	4.91E-02	3.17E+03	3.40	1.62	1.95	1.81	6.65	6.17	0.168	0.672	11.91	2.98	39.59	18.39	28.59	7.15	95.02	44.13
7	30.00	23	2.96E+07	4.91E-02	3.26E+03	3.39	1.62	1.95	1.81	6.61	6.14	0.165	0.660	12.11	3.03	40.04	18.60	29.07	7.27	96.09	44.64

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-114	-
Chainage	11+943	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	125.45	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-114	1.20	22.00	19.50	16.50	237.04	107.69	13.39	3.35
BH-114	1.20	23.50	21.00	18.00	251.95	120.50	13.83	3.46
BH-114	1.20	25.00	22.50	19.50	266.86	133.32	14.35	3.59
BH-114	1.20	26.50	24.00	21.00	281.14	146.13	14.79	3.70
BH-114	1.20	28.00	25.50	22.50	296.05	158.94	15.16	3.79
BH-114	1.20	29.50	27.00	24.00	310.96	171.75	15.47	3.87
BH-114	1.20	30.00	27.50	24.50	315.93	176.03	15.74	3.93

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	6.39	0.05	23	-	6.00	8.68	1.00	-	3.25	4.00	4.80	9.59	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.05	23	-	6.00	8.68	1.00	-	4.75	5.50	14.99	20.38	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	25.78	31.17	5.65	6.13	38.53	44.65	17.86	12.80
4	7.00	8.50	1.50	Granular	7.94	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	37.13	43.09	5.65	8.83	52.17	67.12	26.85	17.65
5	8.50	10.00	1.50	Granular	7.94	0.06	26	-	11.90	13.19	1.00	-	9.25	10.00	49.04	55.00	5.65	12.63	88.79	116.38	46.55	23.56
6	10.00	11.50	1.50	Granular	9.19	0.06	26	-	11.90	13.19	1.00	-	10.75	11.50	61.90	68.79	5.65	15.94	110.45	153.98	61.59	30.40
7	11.50	13.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	12.25	13.00	75.69	82.58	5.65	20.99	176.82	241.34	96.53	38.65
8	13.00	14.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	13.75	14.50	89.48	96.37	5.65	24.82	204.71	294.04	117.62	47.97
9	14.50	16.00	1.50	Granular	9.69	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	103.64	110.91	5.65	28.74	234.65	352.72	141.09	58.39
10	16.00	17.50	1.50	Granular	9.69	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	118.18	125.45	5.65	32.78	264.05	414.90	165.96	69.95
11	17.50	19.00	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	18.25	19.00	125.45	125.45	5.65	36.04	298.22	485.11	194.04	82.41
12	19.00	20.50	1.50	Granular	9.69	0.00	29	-	17.60	20.13	1.00	-	19.75	20.50	125.45	125.45	5.65	36.04	298.22	521.15	208.46	94.88
13	20.50	22.00	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	21.25	22.00	125.45	125.45	5.65	37.28	332.40	592.60	237.04	107.69
14	22.00	23.50	1.50	Granular	9.69	0.03	30	-	19.50	22.44	1.00	-	22.75	23.50	125.45	125.45	5.65	37.28	332.40	629.88	251.95	120.50
15	23.50	25.00	1.50	Granular	9.69	0.13	30	-	19.50	22.44	1.00	-	24.25	25.00	125.45	125.45	5.65	37.28	332.40	667.16	266.86	133.32
16	25.00	26.50	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	25.75	26.50	125.45	125.45	5.65	37.28	330.81	702.84	281.14	146.13
17	26.50	28.00	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	27.25	28.00	125.45	125.45	5.65	37.28	330.81	740.12	296.05	158.94
18	28.00	29.50	1.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	28.75	29.50	125.45	125.45	5.65	37.28	330.81	777.40	310.96	171.75
19	29.50	30.00	0.50	Granular	8.49	0.13	30	-	19.50	22.44	1.00	-	29.75	30.00	125.45	125.45	1.88	12.43	330.81	789.82	315.93	176.03

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	18	2.96E+07	1.02E-01	2.53E+03	4.12	1.33	1.98	1.82	8.15	7.51	0.149	0.598	13.39	3.35	54.57	25.13	32.13	8.03	130.97	60.31
2	22.50	19	2.96E+07	1.02E-01	2.66E+03	4.08	1.35	1.98	1.82	8.07	7.43	0.145	0.579	13.83	3.46	55.76	25.69	33.19	8.30	133.83	61.66
3	24.00	20	2.96E+07	1.02E-01	2.82E+03	4.03	1.36	1.98	1.82	7.97	7.34	0.139	0.558	14.35	3.59	57.15	26.35	34.43	8.61	137.17	63.23
4	25.50	21	2.96E+07	1.02E-01	2.96E+03	4.00	1.38	1.97	1.82	7.89	7.27	0.135	0.541	14.79	3.70	58.32	26.89	35.50	8.87	139.97	64.55
5	27.00	22	2.96E+07	1.02E-01	3.07E+03	3.97	1.39	1.97	1.82	7.82	7.22	0.132	0.528	15.16	3.79	59.29	27.35	36.38	9.09	142.29	65.64
6	28.50	22	2.96E+07	1.02E-01	3.17E+03	3.94	1.40	1.97	1.82	7.77	7.17	0.129	0.517	15.47	3.87	60.11	27.74	37.14	9.28	144.26	66.57
7	30.00	23	2.96E+07	1.02E-01	3.26E+03	3.92	1.40	1.97	1.82	7.73	7.13	0.127	0.508	15.74	3.93	60.78	28.06	37.77	9.44	145.88	67.33

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-115	-
Chainage	12+051	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	98.70	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-115	1.00	22.00	19.50	18.00	136.83	79.69	10.75	2.69
BH-115	1.00	23.50	21.00	19.50	146.25	87.73	10.84	2.71
BH-115	1.00	25.00	22.50	21.00	171.00	96.22	10.96	2.74
BH-115	1.00	26.50	24.00	22.50	180.77	104.71	11.10	2.78
BH-115	1.00	28.00	25.50	24.00	190.55	113.21	11.33	2.83
BH-115	1.00	29.50	27.00	25.50	200.32	121.70	11.52	2.88
BH-115	1.00	30.00	27.50	26.00	203.58	124.53	11.68	2.92

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.44	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	5.58	11.17	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	8.04	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	17.20	23.23	4.71	3.69	27.93	31.62	12.65	7.08
3	5.50	7.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	29.26	35.30	4.71	6.52	47.51	57.72	23.09	10.56
4	7.00	8.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	41.33	47.36	4.71	9.21	62.25	81.67	32.67	14.78
5	8.50	10.00	1.50	Granular	8.04	0.05	27	-	13.80	15.50	1.00	-	9.25	10.00	53.39	59.43	4.71	11.90	77.00	108.32	43.33	19.77
6	10.00	11.50	1.50	Granular	8.49	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	65.80	72.17	4.71	14.66	92.81	138.80	55.52	25.52
7	11.50	13.00	1.50	Granular	8.49	0.11	26	-	11.90	13.19	1.00	-	12.25	13.00	78.54	84.91	4.71	16.85	92.27	155.11	62.04	31.89
8	13.00	14.50	1.50	Granular	9.19	0.11	26	-	11.90	13.19	1.00	-	13.75	14.50	91.80	98.70	4.71	19.70	106.94	189.48	75.79	39.06
9	14.50	16.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	98.70	98.70	4.71	22.81	144.29	249.64	99.86	47.09
10	16.00	17.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	98.70	98.70	4.71	22.81	144.29	272.45	108.98	55.13
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	98.70	98.70	4.71	23.63	162.96	314.75	125.90	63.39
12	19.00	20.50	1.50	Granular	8.49	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	98.70	98.70	4.71	23.63	162.48	337.89	135.16	71.66
13	20.50	22.00	1.50	Granular	8.49	0.09	28	-	15.70	17.82	1.00	-	21.25	22.00	98.70	98.70	4.71	22.81	143.85	342.08	136.83	79.69
14	22.00	23.50	1.50	Granular	9.69	0.09	28	-	15.70	17.82	1.00	-	22.75	23.50	98.70	98.70	4.71	22.81	144.60	365.63	146.25	87.73
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	98.70	98.70	4.71	24.44	182.02	427.49	171.00	96.22
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	98.70	98.70	4.71	24.44	182.02	451.93	180.77	104.71
17	26.50	28.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	98.70	98.70	4.71	24.44	182.02	476.37	190.55	113.21
18	28.00	29.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	98.70	98.70	4.71	24.44	182.02	500.81	200.32	121.70
19	29.50	30.00	0.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	98.70	98.70	1.57	8.15	182.02	508.96	203.58	124.53

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_i/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	4.91E-02	2.99E+03	3.44	1.16	2.00	1.83	6.88	6.30	0.186	0.744	10.75	2.69	36.98	16.93	25.81	6.45	88.75	40.62
2	22.50	21	2.96E+07	4.91E-02	3.03E+03	3.44	1.16	2.00	1.83	6.86	6.28	0.185	0.738	10.84	2.71	37.18	17.02	26.02	6.50	89.23	40.84
3	24.00	22	2.96E+07	4.91E-02	3.08E+03	3.42	1.17	2.00	1.83	6.83	6.26	0.183	0.730	10.96	2.74	37.45	17.14	26.30	6.57	89.87	41.15
4	25.50	22	2.96E+07	4.91E-02	3.15E+03	3.41	1.17	2.00	1.83	6.81	6.23	0.180	0.721	11.10	2.78	37.78	17.30	26.65	6.66	90.67	41.52
5	27.00	23	2.96E+07	4.91E-02	3.25E+03	3.39	1.18	1.99	1.83	6.76	6.19	0.177	0.706	11.33	2.83	38.29	17.54	27.19	6.80	91.89	42.09
6	28.50	23	2.96E+07	4.91E-02	3.33E+03	3.37	1.19	1.99	1.83	6.72	6.16	0.174	0.694	11.52	2.88	38.72	17.74	27.65	6.91	92.94	42.58
7	30.00	24	2.96E+07	4.91E-02	3.41E+03	3.36	1.19	1.99	1.83	6.69	6.13	0.171	0.685	11.68	2.92	39.07	17.90	28.03	7.01	93.77	42.97

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-115	-
Chainage	12+051	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	126.28	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	4.00	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-115	1.20	22.00	19.50	18.00	213.38	110.16	13.99	3.50
BH-115	1.20	23.50	21.00	19.50	227.90	122.34	14.11	3.53
BH-115	1.20	25.00	22.50	21.00	270.42	135.22	14.26	3.56
BH-115	1.20	26.50	24.00	22.50	285.43	148.10	14.45	3.61
BH-115	1.20	28.00	25.50	24.00	300.44	160.98	14.74	3.69
BH-115	1.20	29.50	27.00	25.50	315.45	173.86	14.99	3.75
BH-115	1.20	30.00	27.50	26.00	320.45	178.16	15.19	3.80

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.44	0.04	26	-	11.90	13.19	1.00	-	3.25	4.00	5.58	11.17	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	8.04	0.04	26	-	11.90	13.19	1.00	-	4.75	5.50	17.20	23.23	5.65	4.43	41.30	45.73	18.29	9.95
3	5.50	7.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	6.25	7.00	29.26	35.30	5.65	7.83	69.67	81.93	32.77	14.51
4	7.00	8.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	7.75	8.50	41.33	47.36	5.65	11.05	90.90	114.21	45.68	19.98
5	8.50	10.00	1.50	Granular	8.04	0.05	27	-	13.80	15.50	1.00	-	9.25	10.00	53.39	59.43	5.65	14.28	112.13	149.72	59.89	26.36
6	10.00	11.50	1.50	Granular	8.49	0.05	27	-	13.80	15.50	1.00	-	10.75	11.50	65.80	72.17	5.65	17.60	134.98	190.16	76.06	33.66
7	11.50	13.00	1.50	Granular	8.49	0.11	26	-	11.90	13.19	1.00	-	12.25	13.00	78.54	84.91	5.65	20.23	134.02	209.42	83.77	41.70
8	13.00	14.50	1.50	Granular	9.19	0.11	26	-	11.90	13.19	1.00	-	13.75	14.50	91.80	98.70	5.65	23.64	155.23	254.28	101.71	50.69
9	14.50	16.00	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	15.25	16.00	105.59	112.49	5.65	29.28	237.30	365.63	146.25	61.27
10	16.00	17.50	1.50	Granular	9.19	0.04	28	-	15.70	17.82	1.00	-	16.75	17.50	119.38	126.28	5.65	33.11	265.18	426.63	170.65	72.91
11	17.50	19.00	1.50	Granular	9.19	0.02	29	-	17.60	20.13	1.00	-	18.25	19.00	126.28	126.28	5.65	36.27	299.51	497.23	198.89	85.44
12	19.00	20.50	1.50	Granular	8.49	0.02	29	-	17.60	20.13	1.00	-	19.75	20.50	126.28	126.28	5.65	36.27	298.67	532.66	213.06	97.98
13	20.50	22.00	1.50	Granular	8.49	0.09	28	-	15.70	17.82	1.00	-	21.25	22.00	126.28	126.28	5.65	35.02	264.43	533.45	213.38	110.16
14	22.00	23.50	1.50	Granular	9.69	0.09	28	-	15.70	17.82	1.00	-	22.75	23.50	126.28	126.28	5.65	35.02	265.72	569.75	227.90	122.34
15	23.50	25.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	24.25	25.00	126.28	126.28	5.65	37.52	334.50	676.06	270.42	135.22
16	25.00	26.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	25.75	26.50	126.28	126.28	5.65	37.52	334.50	713.58	285.43	148.10
17	26.50	28.00	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	27.25	28.00	126.28	126.28	5.65	37.52	334.50	751.10	300.44	160.98
18	28.00	29.50	1.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	28.75	29.50	126.28	126.28	5.65	37.52	334.50	788.63	315.45	173.86
19	29.50	30.00	0.50	Granular	9.69	0.04	30	-	19.50	22.44	1.00	-	29.75	30.00	126.28	126.28	1.88	12.51	334.50	801.13	320.45	178.16

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	21	2.96E+07	1.02E-01	2.99E+03	3.99	1.00	2.02	1.83	8.03	7.31	0.143	0.572	13.99	3.50	56.21	25.57	33.58	8.40	134.90	61.36
2	22.50	21	2.96E+07	1.02E-01	3.03E+03	3.98	1.01	2.02	1.83	8.01	7.29	0.142	0.567	14.11	3.53	56.51	25.71	33.86	8.46	135.63	61.70
3	24.00	22	2.96E+07	1.02E-01	3.08E+03	3.96	1.01	2.01	1.83	7.98	7.26	0.140	0.561	14.26	3.56	56.92	25.90	34.22	8.56	136.60	62.15
4	25.50	22	2.96E+07	1.02E-01	3.15E+03	3.95	1.01	2.01	1.83	7.95	7.23	0.138	0.554	14.45	3.61	57.42	26.13	34.68	8.67	137.81	62.71
5	27.00	23	2.96E+07	1.02E-01	3.25E+03	3.92	1.02	2.01	1.83	7.90	7.19	0.136	0.543	14.74	3.69	58.19	26.49	35.38	8.84	139.66	63.57
6	28.50	23	2.96E+07	1.02E-01	3.33E+03	3.90	1.03	2.01	1.83	7.85	7.15	0.133	0.534	14.99	3.75	58.85	26.79	35.98	9.00	141.24	64.31
7	30.00	24	2.96E+07	1.02E-01	3.41E+03	3.88	1.03	2.01	1.83	7.82	7.12	0.132	0.527	15.19	3.80	59.38	27.04	36.47	9.12	142.51	64.89

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-116	-
Chainage	12+130	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.00	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	15.00	mtr
Maximum OBP	92.40	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-116	1.00	22.00	19.50	16.50	139.23	73.81	9.41	2.35
BH-116	1.00	23.50	21.00	18.00	148.38	81.86	9.74	2.44
BH-116	1.00	25.00	22.50	19.50	157.53	89.92	10.20	2.55
BH-116	1.00	26.50	24.00	21.00	166.69	97.97	10.59	2.65
BH-116	1.00	28.00	25.50	22.50	175.84	106.03	10.92	2.73
BH-116	1.00	29.50	27.00	24.00	184.99	114.08	11.20	2.80
BH-116	1.00	30.00	27.50	24.50	188.04	116.77	11.43	2.86

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	4.71	0.00	0.00	0.00	0.00	4.40
2	4.00	5.50	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	4.71	0.00	0.00	0.00	0.00	6.05
3	5.50	7.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	4.71	5.34	27.23	32.57	13.03	9.19
4	7.00	8.50	1.50	Granular	7.94	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	38.33	44.29	4.71	7.59	36.65	49.59	19.83	12.97
5	8.50	10.00	1.50	Granular	7.94	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	50.24	56.20	4.71	10.37	51.33	74.63	29.85	17.52
6	10.00	11.50	1.50	Granular	8.04	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	62.23	68.27	4.71	12.84	61.71	97.86	39.14	22.77
7	11.50	13.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	12.25	13.00	74.30	80.33	4.71	16.56	102.54	155.25	62.10	29.05
8	13.00	14.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	13.75	14.50	86.36	92.40	4.71	19.25	117.29	189.24	75.70	36.09
9	14.50	16.00	1.50	Granular	8.04	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	92.40	92.40	4.71	21.35	134.73	228.03	91.21	43.72
10	16.00	17.50	1.50	Granular	8.49	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	92.40	92.40	4.71	21.35	135.01	249.67	99.87	51.35
11	17.50	19.00	1.50	Granular	8.49	0.08	26	-	11.90	13.19	1.00	-	18.25	19.00	92.40	92.40	4.71	19.83	100.06	234.55	93.82	58.55
12	19.00	20.50	1.50	Granular	9.69	0.08	26	-	11.90	13.19	1.00	-	19.75	20.50	92.40	92.40	4.71	19.83	100.62	254.94	101.98	65.75
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	92.40	92.40	4.71	22.88	170.88	348.07	139.23	73.81
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	92.40	92.40	4.71	22.88	170.88	370.95	148.38	81.86
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	92.40	92.40	4.71	22.88	170.88	393.83	157.53	89.92
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	92.40	92.40	4.71	22.88	170.88	416.71	166.69	97.97
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	92.40	92.40	4.71	22.88	170.88	439.59	175.84	106.03
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	92.40	92.40	4.71	22.88	170.88	462.47	184.99	114.08
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	92.40	92.40	1.57	7.63	170.88	470.10	188.04	116.77

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	4.91E-02	2.20E+03	3.66	1.50	1.96	1.82	7.19	6.66	0.213	0.850	9.41	2.35	33.83	15.66	22.58	5.65	81.20	37.59
2	22.50	16	2.96E+07	4.91E-02	2.32E+03	3.63	1.52	1.96	1.82	7.11	6.58	0.205	0.821	9.74	2.44	34.63	16.04	23.39	5.85	83.11	38.49
3	24.00	18	2.96E+07	4.91E-02	2.49E+03	3.57	1.54	1.96	1.82	7.00	6.49	0.196	0.784	10.20	2.55	35.71	16.55	24.49	6.12	85.71	39.72
4	25.50	19	2.96E+07	4.91E-02	2.64E+03	3.53	1.56	1.96	1.82	6.91	6.41	0.189	0.755	10.59	2.65	36.62	16.98	25.43	6.36	87.88	40.75
5	27.00	20	2.96E+07	4.91E-02	2.77E+03	3.50	1.57	1.96	1.81	6.84	6.35	0.183	0.733	10.92	2.73	37.36	17.33	26.20	6.55	89.66	41.59
6	28.50	20	2.96E+07	4.91E-02	2.88E+03	3.47	1.58	1.95	1.81	6.79	6.30	0.179	0.714	11.20	2.80	37.99	17.63	26.87	6.72	91.18	42.31
7	30.00	21	2.96E+07	4.91E-02	2.97E+03	3.45	1.59	1.95	1.81	6.74	6.26	0.175	0.700	11.43	2.86	38.51	17.87	27.42	6.86	92.42	42.90

SUMMARY OF PILE LOAD CARRYING CAPACITY

Borehole ID	BH-116	-
Chainage	12+130	km
Bottom Depth of pile	30.00	mtr
Cut off length	2.50	mtr
Dia of Pile	1.20	mtr
Strength of Pile Concrete	35.00	N/mm^2
Factor of Safety	2.50	mtr
Critical Depth(15D)	18.00	mtr
Maximum OBP	117.20	kN/m^2
Pile shaft Length Below cut-off	27.50	mtr
RL of Ground Level	0.00	mtr
Maximum of Scour or Liqufiable Soil Depth	5.50	mtr
Groundwater Level from OGL	0.00	mtr

BH ID	Pile Dia	Total Depth of Pile from EGL	Effective Pile Depth from Cutoff Level	Grip Length (Total Pile Depth-Liquefiable Depth)	Total Pile Axial Capacity	Uplift Capacity (IRC-78-2014)	Lateral Capacity (Fixed Head) (5mm)	Lateral Capacity (Free Head) (5mm)
-	mtr	mtr	mtr	mtr	T	T	T	T
BH-116	1.20	22.00	19.50	16.50	220.38	101.91	12.22	3.06
BH-116	1.20	23.50	21.00	18.00	234.31	114.04	12.66	3.16
BH-116	1.20	25.00	22.50	19.50	248.24	126.17	13.26	3.31
BH-116	1.20	26.50	24.00	21.00	262.18	138.29	13.76	3.44
BH-116	1.20	28.00	25.50	22.50	276.11	150.42	14.18	3.55
BH-116	1.20	29.50	27.00	24.00	290.04	162.55	14.55	3.64
BH-116	1.20	30.00	27.50	24.50	294.68	166.59	14.84	3.71

LOAD CARRYING CAPACITY OF PILES - STATIC ANALYSIS (AS PER IS-2911:2010)

Layer No	Soil Layer							Bearing Capacity Factor			Co-eff. of Earth Pressure (K_i)	Adhesion Factor (α)	Effective Depth		Effective Overburden Pressure		Surface Area of Pile Shaft (A_{si})	Ultimate Bearing Capacity by Skin Friction	Ultimate Bearing Capacity by End Bearing Resistance	Ultimate Total Pile Axial Capacity	Safe Total Pile Axial Capacity	Safe Pile Uplift Capacity
	Start	End	Thick of Layer	Soil Layer	Effective Soil Weight (γ)	Cohesion ©	Angle of Internal Friction (φ)	N_c	N_q	N_γ			at Mid of Pile Shaft	at Pile Tip	at Mid of Pile Shaft (P_{Di})	at Pile Tip (P_D)						
	mtr	mtr	mtr	-	kN/m^3	kN/m^2	Degree	-	-	-	-	-	mtr	mtr	kN/m^2	kN/m^2	m^2	T	T	T	T	T
1	2.50	4.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	3.25	4.00	5.40	10.79	5.65	0.00	0.00	0.00	0.00	6.33
2	4.00	5.50	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	4.75	5.50	16.19	21.58	5.65	0.00	0.00	0.00	0.00	8.71
3	5.50	7.00	1.50	Granular	7.19	0.02	24	-	8.00	9.78	1.00	-	6.25	7.00	26.98	32.37	5.65	6.41	39.86	46.27	18.51	12.88
4	7.00	8.50	1.50	Granular	7.94	0.02	24	-	8.00	9.78	1.00	-	7.75	8.50	38.33	44.29	5.65	9.11	53.50	69.02	27.61	17.81
5	8.50	10.00	1.50	Granular	7.94	0.08	25	-	10.00	10.88	1.00	-	9.25	10.00	50.24	56.20	5.65	12.44	74.81	102.78	41.11	23.66
6	10.00	11.50	1.50	Granular	8.04	0.08	25	-	10.00	10.88	1.00	-	10.75	11.50	62.23	68.27	5.65	15.41	89.78	133.16	53.26	30.35
7	11.50	13.00	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	12.25	13.00	74.30	80.33	5.65	19.87	148.92	212.17	84.87	38.29
8	13.00	14.50	1.50	Granular	8.04	0.03	27	-	13.80	15.50	1.00	-	13.75	14.50	86.36	92.40	5.65	23.10	170.15	256.50	102.60	47.13
9	14.50	16.00	1.50	Granular	8.04	0.02	28	-	15.70	17.82	1.00	-	15.25	16.00	98.43	104.46	5.65	27.30	219.84	333.48	133.39	57.15
10	16.00	17.50	1.50	Granular	8.49	0.02	28	-	15.70	17.82	1.00	-	16.75	17.50	110.83	117.20	5.65	30.74	246.08	390.46	156.18	68.14
11	17.50	19.00	1.50	Granular	8.49	0.08	26	-	11.90	13.19	1.00	-	18.25	19.00	117.20	117.20	5.65	30.18	182.37	356.94	142.77	78.96
12	19.00	20.50	1.50	Granular	9.69	0.08	26	-	11.90	13.19	1.00	-	19.75	20.50	117.20	117.20	5.65	30.18	183.35	388.09	155.24	89.79
13	20.50	22.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	21.25	22.00	117.20	117.20	5.65	34.83	311.39	550.96	220.38	101.91
14	22.00	23.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	22.75	23.50	117.20	117.20	5.65	34.83	311.39	585.78	234.31	114.04
15	23.50	25.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	24.25	25.00	117.20	117.20	5.65	34.83	311.39	620.61	248.24	126.17
16	25.00	26.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	25.75	26.50	117.20	117.20	5.65	34.83	311.39	655.44	262.18	138.29
17	26.50	28.00	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	27.25	28.00	117.20	117.20	5.65	34.83	311.39	690.26	276.11	150.42
18	28.00	29.50	1.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	28.75	29.50	117.20	117.20	5.65	34.83	311.39	725.09	290.04	162.55
19	29.50	30.00	0.50	Granular	9.69	0.02	30	-	19.50	22.44	1.00	-	29.75	30.00	117.20	117.20	1.88	11.61	311.39	736.70	294.68	166.59

LATERALLY LOAD CARING CAPACITY OF PILE (AS PER IS-2911:2010)

SR No.	Depth of Pile	SPT N Value	Young's Modulus of Pile Material (E)	Moment of Intertia of Pile Section (I)	Modulus of Subgrade Reaction (n_h)	Stiffness Factor (T)	L_i/T Ratio	L_e/T Ratio		Depth to Point of Fixity (z_f)		Deflection for 1 Ton Lateral Load (y)		Lateral Load, for 5 mm deflection, (H)		Fixed End Moment (M_F)		Lateral Load, for 12 mm deflection, (H)		Fixed End Moment (M_F)	
								Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head	Fixed Head	Free Head
-	mtr	-	kN/m^2	m^4	kN/m^3	mtr	-	-	-	mtr	mtr	mm	mm	T	T	T.m	T.m	T	T	T.m	T.m
1	21.00	16	2.96E+07	1.02E-01	2.20E+03	4.24	1.30	1.98	1.82	8.40	7.73	0.164	0.654	12.22	3.06	51.37	23.62	29.34	7.33	123.28	56.70
2	22.50	16	2.96E+07	1.02E-01	2.32E+03	4.19	1.31	1.98	1.82	8.31	7.64	0.158	0.632	12.66	3.16	52.58	24.19	30.38	7.60	126.19	58.07
3	24.00	18	2.96E+07	1.02E-01	2.49E+03	4.13	1.33	1.98	1.82	8.18	7.53	0.151	0.603	13.26	3.31	54.22	24.96	31.82	7.95	130.12	59.91
4	25.50	19	2.96E+07	1.02E-01	2.64E+03	4.09	1.35	1.98	1.82	8.08	7.44	0.145	0.581	13.76	3.44	55.59	25.61	33.03	8.26	133.41	61.46
5	27.00	20	2.96E+07	1.02E-01	2.77E+03	4.05	1.36	1.98	1.82	8.00	7.37	0.141	0.564	14.18	3.55	56.72	26.14	34.04	8.51	136.12	62.74
6	28.50	20	2.96E+07	1.02E-01	2.88E+03	4.02	1.37	1.97	1.82	7.93	7.31	0.137	0.550	14.55	3.64	57.68	26.59	34.91	8.73	138.43	63.82
7	30.00	21	2.96E+07	1.02E-01	2.97E+03	3.99	1.38	1.97	1.82	7.88	7.27	0.135	0.539	14.84	3.71	58.46	26.96	35.62	8.91	140.31	64.71

Appendix B Summary Liquefaction Potential Assessment

B.1. Zone 1: CH: 0-380 km to 0+500 km (BH-(-02) to BH-(-10))

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-(-10)	0.00	2.50	7	7	11	16	0.29	0.40	0.72	Liquefiable Soil
BH-(-10)	2.50	4.00	8	8	14	19	0.28	0.39	0.70	Liquefiable Soil
BH-(-10)	4.00	5.50	9	10	16	23	0.32	0.39	0.83	Liquefiable Soil
BH-(-10)	5.50	7.00	12	14	23	23	0.32	0.39	0.82	Liquefiable Soil
BH-(-09)	0.00	2.50	5	5	8	14	0.25	0.40	0.62	Liquefiable Soil
BH-(-09)	2.50	4.00	7	7	12	18	0.27	0.39	0.69	Liquefiable Soil
BH-(-09)	4.00	5.50	9	10	16	24	0.34	0.39	0.88	Liquefiable Soil
BH-(-08)	0.00	2.50	5	5	8	10	0.19	0.40	0.48	Liquefiable Soil
BH-(-08)	2.50	4.00	7	7	12	15	0.22	0.39	0.56	Liquefiable Soil
BH-(-08)	4.00	5.50	9	10	16	23	0.33	0.38	0.87	Liquefiable Soil
BH-(-06)	0.00	2.50	5	5	8	10	0.19	0.40	0.48	Liquefiable Soil
BH-(-06)	2.50	4.00	7	7	12	15	0.22	0.39	0.56	Liquefiable Soil
BH-(-06)	4.00	5.50	9	10	16	22	0.31	0.38	0.81	Liquefiable Soil
BH-(-05)	0.00	2.50	6	6	10	13	0.24	0.40	0.60	Liquefiable Soil
BH-(-05)	2.50	4.00	7	7	12	15	0.22	0.39	0.56	Liquefiable Soil
BH-(-05)	4.00	5.50	9	10	16	23	0.33	0.39	0.84	Liquefiable Soil
BH-(-05)	5.50	7.00	10	12	19	26	0.39	0.39	1.01	Liquefiable Soil
BH-(-03)	0.00	2.50	5	5	8	12	0.21	0.40	0.53	Liquefiable Soil
BH-(-03)	2.50	4.00	7	7	12	16	0.23	0.39	0.59	Liquefiable Soil
BH-(-03)	4.00	5.50	9	10	16	23	0.34	0.39	0.87	Liquefiable Soil
BH-(-02)	0.00	2.50	6	6	10	15	0.27	0.40	0.68	Liquefiable Soil
BH-(-02)	2.50	4.00	7	7	12	17	0.24	0.39	0.62	Liquefiable Soil
BH-(-02)	4.00	5.50	9	10	16	22	0.30	0.39	0.78	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-(-10)
Chainage	0-372

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish to Greyish, fine-grained silty sand with Gravel (SM)	0.00	6.25	15.95	6.14
2	Medium Dense, Greyish, fine-grained silty sand (SM)	6.25	12.25	17.55	7.74
3	Dense, Greyish, fine-grained silty sand (SM)	12.25	16.00	18.50	8.69
4	Very Dense, Greyish to lite brownish, fine-grained silty sand (SM)	16.00	21.25	20.00	10.19
5	Very Dense, Greyish to Reddish brown, fine-grained silty sand (SM)	21.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	19.94	7.68	7	0.75	0.90	1.33	1.05	7	1.70	11	21.87	3.91	1.09	16	0.17	1.00	0.10	0.80	1.67	1.00	0.29	0.99	0.401	0.72	Liquefiable Soil
2	2.50	4.00	3.25	51.84	19.97	8	0.80	0.90	1.33	1.05	8	1.70	14	21.87	3.91	1.09	19	0.20	1.00	0.15	0.80	1.38	1.00	0.28	0.98	0.395	0.70	Liquefiable Soil
3	4.00	5.50	4.75	75.76	29.18	9	0.85	0.90	1.33	1.05	10	1.70	16	25.86	4.37	1.12	23	0.25	1.00	0.17	0.80	1.28	1.00	0.32	0.96	0.390	0.83	Liquefiable Soil
4	5.50	7.00	6.25	99.69	38.40	12	0.95	0.90	1.33	1.05	14	1.61	23	5.60	0.01	1.00	23	0.26	1.00	0.25	0.80	1.21	1.00	0.32	0.95	0.386	0.82	Liquefiable Soil
5	7.00	8.50	7.75	126.01	50.01	16	0.95	0.90	1.33	1.05	19	1.41	27	24.76	4.26	1.11	34	NL	1.00	0.32	0.80	1.15	1.00	NL	0.94	0.370	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	152.34	61.63	27	0.95	0.90	1.33	1.05	32	1.27	41	24.76	4.26	1.11	50	NL	1.00	0.53	0.74	1.14	1.00	NL	0.93	0.358	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	178.66	73.24	30	1.00	0.90	1.33	1.05	38	1.17	44	29.90	4.70	1.15	56	NL	1.00	0.61	0.69	1.10	1.00	NL	0.89	0.338	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	204.99	84.86	39	1.00	0.90	1.33	1.05	49	1.09	53	18.96	3.43	1.07	60	NL	1.00	0.85	0.60	1.07	1.00	NL	0.85	0.319	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	232.74	97.90	44	1.00	0.90	1.33	1.05	55	1.01	56	26.47	4.43	1.13	67	NL	1.00	0.85	0.60	1.01	1.00	NL	0.81	0.299	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	260.49	110.94	46	1.00	0.90	1.33	1.05	58	0.95	55	12.14	1.60	1.03	58	NL	1.00	0.85	0.60	0.96	1.00	NL	0.77	0.281	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	289.36	125.10	54	1.00	0.90	1.33	1.05	68	0.89	61	21.30	3.82	1.09	70	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.262	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	319.36	140.39	43	1.00	0.90	1.33	1.05	54	0.84	46	13.62	2.09	1.04	50	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.244	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	349.36	155.68	54	1.00	0.90	1.33	1.05	68	0.80	54	22.03	3.93	1.09	63	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.226	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	379.36	170.97	65	1.00	0.90	1.33	1.05	82	0.76	62	15.90	2.74	1.05	69	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.210	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	409.36	186.26	76	1.00	0.90	1.33	1.05	96	0.73	70	26.78	4.46	1.13	83	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.194	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	439.36	201.55	100	1.00	0.90	1.33	1.05	126	0.70	89	21.42	3.84	1.09	100	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	469.36	216.84	100	1.00	0.90	1.33	1.05	126	0.68	85	30.10	4.71	1.16	103	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	499.36	232.13	100	1.00	0.90	1.33	1.05	126	0.66	82	19.33	3.50	1.07	92	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	534.36	249.97	100	1.00	0.90	1.33	1.05	126	0.63	79	24.17	4.20	1.11	92	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	554.36	260.16	100	1.00	0.90	1.33	1.05	126	0.62	78	20.79	3.74	1.08	88	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-(-09)
Chainage	0-224

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Dark Brownish to Greyish, fine-grained silty sand (SM)	0.00	6.25	15.95	6.14
2	Medium Dense, Greyish, fine-grained silty sand (SM)	6.25	12.25	17.55	7.74
3	Dense, Greyish, fine-grained silty sand (SM)	12.25	16.00	18.50	8.69
4	Very Dense, Brownish to Greyish, fine-grained silty sand and Gravel (SM)	16.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	19.94	7.68	5	0.75	0.90	1.33	1.05	5	1.70	8	29.83	4.69	1.15	14	0.15	1.00	0.03	0.80	1.67	1.00	0.25	0.99	0.401	0.62	Liquefiable Soil
2	2.50	4.00	3.25	51.84	19.97	7	0.80	0.90	1.33	1.05	7	1.70	12	29.83	4.69	1.15	18	0.20	1.00	0.11	0.80	1.38	1.00	0.27	0.98	0.395	0.69	Liquefiable Soil
3	4.00	5.50	4.75	75.76	29.18	9	0.85	0.90	1.33	1.05	10	1.70	16	30.44	4.73	1.16	24	0.27	1.00	0.17	0.80	1.28	1.00	0.34	0.96	0.390	0.88	Liquefiable Soil
4	5.50	7.00	6.25	99.69	38.40	13	0.95	0.90	1.33	1.05	16	1.61	25	30.44	4.73	1.16	34	NL	1.00	0.27	0.80	1.21	1.00	NL	0.95	0.386	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	126.01	50.01	17	0.95	0.90	1.33	1.05	20	1.41	29	19.82	3.58	1.08	35	NL	1.00	0.34	0.80	1.15	1.00	NL	0.94	0.370	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	152.34	61.63	19	0.95	0.90	1.33	1.05	23	1.27	29	13.89	2.17	1.04	32	NL	1.00	0.38	0.80	1.10	1.00	NL	0.93	0.358	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	178.66	73.24	26	1.00	0.90	1.33	1.05	33	1.17	38	27.00	4.48	1.13	48	NL	1.00	0.53	0.73	1.09	1.00	NL	0.89	0.338	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	204.99	84.86	33	1.00	0.90	1.33	1.05	41	1.09	45	24.00	4.18	1.11	54	NL	1.00	0.85	0.60	1.07	1.00	NL	0.85	0.319	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	232.74	97.90	43	1.00	0.90	1.33	1.05	54	1.01	55	22.12	3.94	1.09	64	NL	1.00	0.85	0.60	1.01	1.00	NL	0.81	0.299	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	260.49	110.94	48	1.00	0.90	1.33	1.05	60	0.95	57	26.17	4.40	1.12	69	NL	1.00	0.85	0.60	0.96	1.00	NL	0.77	0.281	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	289.36	125.10	56	1.00	0.90	1.33	1.05	70	0.89	63	28.56	4.60	1.14	77	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.262	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	319.36	140.39	54	1.00	0.90	1.33	1.05	68	0.84	57	22.80	4.03	1.10	67	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.244	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	349.36	155.68	64	1.00	0.90	1.33	1.05	80	0.80	64	29.83	4.69	1.15	79	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.226	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	379.36	170.97	67	1.00	0.90	1.33	1.05	84	0.76	64	22.56	4.00	1.10	75	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.210	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	409.36	186.26	88	1.00	0.90	1.33	1.05	111	0.73	81	20.18	3.65	1.08	91	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.194	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	439.36	201.55	100	1.00	0.90	1.33	1.05	126	0.70	89	22.81	4.03	1.10	101	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	469.36	216.84	100	1.00	0.90	1.33	1.05	126	0.68	85	23.10	4.07	1.10	98	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	499.36	232.13	100	1.00	0.90	1.33	1.05	126	0.66	82	24.44	4.23	1.11	96	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	534.36	249.97	100	1.00	0.90	1.33	1.05	126	0.63	79	23.08	4.07	1.10	92	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	554.36	260.16	100	1.00	0.90	1.33	1.05	126	0.62	78	25.78	4.37	1.12	92	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-(-08)
Chainage	0-174

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff, Brownish, fine-grained inorganic silt of low Plasticity with	0.00	4.00	16.00	6.19
2	Loose to Medium Dense, Gray brownish to Brownish, fine-grained silty s	4.00	12.25	17.00	7.19
3	Dense, Greyish, fine-grained silty sand (SM)	12.25	15.25	18.50	8.69
4	Very Dense, Brownish Gray, fine-grained silty sand (SM)	15.25	21.25	20.00	10.19
5	Very Dense, Lite Brownish, fine-grained silty sand (SM)	21.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.00	7.74	5	0.75	0.90	1.33	1.05	5	1.70	8	74.05	0.50	1.20	10	0.11	1.00	0.03	0.80	1.67	1.00	0.19	0.99	0.399	0.48	Liquefiable Soil
2	2.50	4.00	3.25	52.00	20.13	7	0.80	0.90	1.33	1.05	7	1.70	12	78.30	0.50	1.20	15	0.16	1.00	0.11	0.80	1.38	1.00	0.22	0.98	0.393	0.56	Liquefiable Soil
3	4.00	5.50	4.75	76.75	30.17	9	0.85	0.90	1.33	1.05	10	1.70	16	28.35	4.59	1.14	23	0.26	1.00	0.17	0.80	1.27	1.00	0.33	0.96	0.382	0.87	Liquefiable Soil
4	5.50	7.00	6.25	102.25	40.96	12	0.95	0.90	1.33	1.05	14	1.56	22	28.35	4.59	1.14	30	NL	1.00	0.25	0.80	1.20	1.00	NL	0.95	0.371	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	127.75	51.75	16	0.95	0.90	1.33	1.05	19	1.39	27	22.39	3.98	1.10	33	NL	1.00	0.32	0.80	1.14	1.00	NL	0.94	0.362	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	153.25	62.54	22	0.95	0.90	1.33	1.05	26	1.26	33	22.39	3.98	1.10	40	NL	1.00	0.43	0.78	1.11	1.00	NL	0.93	0.355	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	178.75	73.33	28	1.00	0.90	1.33	1.05	35	1.17	41	17.35	3.09	1.06	47	NL	1.00	0.57	0.71	1.09	1.00	NL	0.89	0.337	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	204.25	84.12	33	1.00	0.90	1.33	1.05	41	1.09	45	22.04	3.93	1.09	53	NL	1.00	0.85	0.60	1.07	1.00	NL	0.85	0.321	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	232.00	97.16	47	1.00	0.90	1.33	1.05	59	1.01	60	18.88	3.41	1.07	68	NL	1.00	0.85	0.60	1.01	1.00	NL	0.81	0.301	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	259.75	110.20	54	1.00	0.90	1.33	1.05	68	0.95	65	21.90	3.91	1.09	75	NL	1.00	0.85	0.60	0.96	1.00	NL	0.77	0.282	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	289.75	125.49	63	1.00	0.90	1.33	1.05	79	0.89	71	22.54	4.00	1.10	82	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.262	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	319.75	140.78	63	1.00	0.90	1.33	1.05	79	0.84	67	23.32	4.10	1.10	78	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.243	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	349.75	156.07	68	1.00	0.90	1.33	1.05	85	0.80	68	24.81	4.27	1.11	80	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.226	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	379.75	171.36	74	1.00	0.90	1.33	1.05	93	0.76	71	21.61	3.87	1.09	81	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.210	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	409.75	186.65	80	1.00	0.90	1.33	1.05	101	0.73	74	22.33	3.97	1.10	85	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.194	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	439.75	201.94	100	1.00	0.90	1.33	1.05	126	0.70	88	16.49	2.89	1.06	96	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	469.75	217.23	100	1.00	0.90	1.33	1.05	126	0.68	85	21.10	3.79	1.09	96	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	499.75	232.52	100	1.00	0.90	1.33	1.05	126	0.66	82	23.20	4.08	1.10	95	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	534.75	250.36	100	1.00	0.90	1.33	1.05	126	0.63	79	30.52	4.74	1.16	97	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	554.75	260.55	100	1.00	0.90	1.33	1.05	126	0.62	78	22.76	4.03	1.10	90	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-(-06)
Chainage	0-015

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff, Lite Brownish, fine-grained inorganic silt of low Plasticity	0.00	4.00	16.00	6.19
2	Loose to Medium Dense, Brownish to dark brownish, fine-grained silty sa	4.00	11.25	17.00	7.19
3	Hard, Dark Brownish, fine-grained inorganic silt of low Plasticity with sa	11.25	14.25	18.50	8.69
4	Very Dense, Dark Greyish, fine-grained silty sand (SM)	14.25	21.25	20.00	10.19
5	Very Dense, Gray Brownish, fine-grained silty sand (SM)	21.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.00	7.74	5	0.75	0.90	1.33	1.05	5	1.70	8	74.50	0.50	1.20	10	0.11	1.00	0.03	0.80	1.67	1.00	0.19	0.99	0.399	0.48	Liquefiable Soil
2	2.50	4.00	3.25	52.00	20.13	7	0.80	0.90	1.33	1.05	7	1.70	12	74.50	0.50	1.20	15	0.16	1.00	0.11	0.80	1.38	1.00	0.22	0.98	0.393	0.56	Liquefiable Soil
3	4.00	5.50	4.75	76.75	30.17	9	0.85	0.90	1.33	1.05	10	1.70	16	23.63	4.14	1.10	22	0.24	1.00	0.17	0.80	1.27	1.00	0.31	0.96	0.382	0.81	Liquefiable Soil
4	5.50	7.00	6.25	102.25	40.96	12	0.95	0.90	1.33	1.05	14	1.56	22	27.35	4.51	1.13	30	0.46	1.00	0.25	0.80	1.20	1.00	0.55	0.95	0.371	1.48	Non Liquefiable Soil
5	7.00	8.50	7.75	127.75	51.75	16	0.95	0.90	1.33	1.05	19	1.39	27	21.11	3.79	1.09	33	NL	1.00	0.32	0.80	1.14	1.00	NL	0.94	0.362	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	153.25	62.54	19	0.95	0.90	1.33	1.05	23	1.26	29	21.11	3.79	1.09	35	NL	1.00	0.38	0.80	1.10	1.00	NL	0.93	0.355	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	178.75	73.33	28	1.00	0.90	1.33	1.05	35	1.17	41	30.40	4.73	1.16	52	NL	1.00	0.57	0.71	1.09	1.00	NL	0.89	0.337	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	205.75	85.62	37	1.00	0.90	1.33	1.05	47	1.08	50	20.89	3.76	1.09	58	NL	1.00	0.85	0.60	1.06	1.00	NL	0.85	0.317	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	233.50	98.66	42	1.00	0.90	1.33	1.05	53	1.01	53	63.72	0.50	1.20	64	NL	1.00	0.85	0.60	1.01	1.00	NL	0.81	0.298	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	262.75	113.20	55	1.00	0.90	1.33	1.05	69	0.94	65	19.50	3.53	1.08	73	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.278	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	292.75	128.49	61	1.00	0.90	1.33	1.05	77	0.88	68	24.39	4.22	1.11	79	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.258	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	322.75	143.78	67	1.00	0.90	1.33	1.05	84	0.83	70	21.48	3.85	1.09	80	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.240	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	352.75	159.07	75	1.00	0.90	1.33	1.05	94	0.79	75	26.74	4.46	1.13	89	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.224	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	382.75	174.36	55	1.00	0.90	1.33	1.05	69	0.76	52	68.16	0.50	1.20	63	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.208	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	412.75	189.65	63	1.00	0.90	1.33	1.05	79	0.73	57	23.01	4.06	1.10	67	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	442.75	204.94	100	1.00	0.90	1.33	1.05	126	0.70	88	20.46	3.69	1.08	99	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	472.75	220.23	100	1.00	0.90	1.33	1.05	126	0.67	85	20.92	3.77	1.09	96	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	502.75	235.52	100	1.00	0.90	1.33	1.05	126	0.65	82	21.18	3.81	1.09	93	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.75	253.36	100	1.00	0.90	1.33	1.05	126	0.63	79	28.56	4.60	1.14	95	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	557.75	263.55	100	1.00	0.90	1.33	1.05	126	0.62	77	21.09	3.79	1.09	88	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-(-05)
Chainage	0+094

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	7.00	15.95	6.14
2	Medium Dense, Brownish to yellowish, fine-grained silty sand with grave	7.00	10.00	17.50	7.69
3	Dense to very Dense, Brownish to yellowish, fine-grained silty sand with	10.00	20.25	19.50	9.69
4	Very Dense, Brownish Gray to Brownish, fine-grained silty sand and Grav	20.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	19.94	7.68	6	0.75	0.90	1.33	1.05	6	1.70	10	17.75	3.18	1.06	13	0.14	1.00	0.06	0.80	1.67	1.00	0.24	0.99	0.401	0.60	Liquefiable Soil
2	2.50	4.00	3.25	51.84	19.97	7	0.80	0.90	1.33	1.05	7	1.70	12	15.35	2.60	1.05	15	0.16	1.00	0.11	0.80	1.38	1.00	0.22	0.98	0.395	0.56	Liquefiable Soil
3	4.00	5.50	4.75	75.76	29.18	9	0.85	0.90	1.33	1.05	10	1.70	16	27.20	4.50	1.13	23	0.26	1.00	0.17	0.80	1.28	1.00	0.33	0.96	0.390	0.84	Liquefiable Soil
4	5.50	7.00	6.25	99.69	38.40	10	0.95	0.90	1.33	1.05	12	1.61	19	27.20	4.50	1.13	26	0.32	1.00	0.21	0.80	1.21	1.00	0.39	0.95	0.386	1.01	Liquefiable Soil
5	7.00	8.50	7.75	124.78	48.77	16	0.95	0.90	1.33	1.05	19	1.43	27	32.00	4.83	1.17	37	NL	1.00	0.32	0.80	1.15	1.00	NL	0.94	0.375	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	151.03	60.31	23	0.95	0.90	1.33	1.05	27	1.29	35	22.50	3.99	1.10	43	NL	1.00	0.45	0.77	1.12	1.00	NL	0.93	0.363	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	178.78	73.35	31	1.00	0.90	1.33	1.05	39	1.17	45	22.30	3.97	1.10	54	NL	1.00	0.63	0.68	1.10	1.00	NL	0.89	0.337	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.03	87.89	35	1.00	0.90	1.33	1.05	44	1.07	47	22.30	3.97	1.10	55	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.313	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	237.28	102.43	43	1.00	0.90	1.33	1.05	54	0.99	53	31.70	4.81	1.17	67	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.292	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	266.53	116.97	44	1.00	0.90	1.33	1.05	55	0.92	51	22.86	4.04	1.10	60	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.273	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	295.78	131.51	56	1.00	0.90	1.33	1.05	70	0.87	61	27.28	4.50	1.13	74	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.255	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	325.03	146.05	41	1.00	0.90	1.33	1.05	52	0.83	43	21.80	3.90	1.09	50	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.238	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	354.28	160.59	50	1.00	0.90	1.33	1.05	63	0.79	50	24.04	4.18	1.11	59	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	384.03	175.63	59	1.00	0.90	1.33	1.05	74	0.75	56	20.90	3.76	1.09	65	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	414.03	190.92	66	1.00	0.90	1.33	1.05	83	0.72	60	27.35	4.51	1.13	73	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	444.03	206.21	100	1.00	0.90	1.33	1.05	126	0.70	88	21.90	3.91	1.09	100	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	474.03	221.50	100	1.00	0.90	1.33	1.05	126	0.67	84	21.10	3.79	1.09	96	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.03	236.79	100	1.00	0.90	1.33	1.05	126	0.65	82	22.01	3.93	1.09	93	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	539.03	254.63	100	1.00	0.90	1.33	1.05	126	0.63	79	29.77	4.69	1.15	95	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	559.03	264.83	100	1.00	0.90	1.33	1.05	126	0.61	77	18.98	3.43	1.07	86	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-(-03)
Chainage	0+344

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	5.25	15.95	6.14
2	Medium Dense, Greyish, fine-grained silty sand (SM)	5.25	10.00	17.55	7.74
3	Dense, Gray Brownish, fine-grained silty sand (SM)	10.00	16.00	18.50	8.69
4	Dense to very Dense, Brownish to Greyish, fine-grained silty sand with gr	16.00	21.25	19.50	9.69
5	Very Dense, Gray Brownish to little brownish, fine-grained silty sand and	21.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	19.94	7.68	5	0.75	0.90	1.33	1.05	5	1.70	8	17.39	3.10	1.06	12	0.13	1.00	0.03	0.80	1.67	1.00	0.21	0.99	0.401	0.53	Liquefiable Soil
2	2.50	4.00	3.25	51.84	19.97	7	0.80	0.90	1.33	1.05	7	1.70	12	17.39	3.10	1.06	16	0.17	1.00	0.11	0.80	1.38	1.00	0.23	0.98	0.395	0.59	Liquefiable Soil
3	4.00	5.50	4.75	75.76	29.18	9	0.85	0.90	1.33	1.05	10	1.70	16	29.55	4.68	1.15	23	0.26	1.00	0.17	0.80	1.28	1.00	0.34	0.96	0.390	0.87	Liquefiable Soil
4	5.50	7.00	6.25	101.29	40.00	12	0.95	0.90	1.33	1.05	14	1.58	23	21.37	3.83	1.09	29	0.39	1.00	0.25	0.80	1.20	1.00	0.47	0.95	0.376	1.24	Non Liquefiable Soil
5	7.00	8.50	7.75	127.61	51.61	17	0.95	0.90	1.33	1.05	20	1.39	28	27.83	4.55	1.14	37	NL	1.00	0.34	0.80	1.14	1.00	NL	0.94	0.363	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	153.94	63.23	24	0.95	0.90	1.33	1.05	29	1.26	36	27.83	4.55	1.14	46	NL	1.00	0.47	0.76	1.11	1.00	NL	0.93	0.353	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	180.98	75.55	34	1.00	0.90	1.33	1.05	43	1.15	49	23.07	4.07	1.10	58	NL	1.00	0.85	0.60	1.12	1.00	NL	0.89	0.331	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.73	88.59	35	1.00	0.90	1.33	1.05	44	1.06	47	24.90	4.28	1.11	56	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.311	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	236.48	101.63	42	1.00	0.90	1.33	1.05	53	0.99	52	26.11	4.40	1.12	63	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.293	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	264.23	114.67	44	1.00	0.90	1.33	1.05	55	0.93	52	22.30	3.97	1.10	61	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.276	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	292.73	128.46	51	1.00	0.90	1.33	1.05	64	0.88	57	20.84	3.75	1.09	65	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.258	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	321.98	143.00	41	1.00	0.90	1.33	1.05	52	0.84	43	23.30	4.10	1.10	52	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.241	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	351.23	157.54	44	1.00	0.90	1.33	1.05	55	0.80	44	29.13	4.65	1.15	55	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.225	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	380.48	172.08	66	1.00	0.90	1.33	1.05	83	0.76	63	23.98	4.18	1.11	74	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.209	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	410.48	187.37	81	1.00	0.90	1.33	1.05	102	0.73	74	30.64	4.75	1.16	91	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.194	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	440.48	202.66	100	1.00	0.90	1.33	1.05	126	0.70	88	24.32	4.22	1.11	102	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	470.48	217.95	100	1.00	0.90	1.33	1.05	126	0.68	85	22.64	4.01	1.10	97	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	500.48	233.24	100	1.00	0.90	1.33	1.05	126	0.65	82	23.33	4.10	1.10	95	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	535.48	251.08	100	1.00	0.90	1.33	1.05	126	0.63	79	21.14	3.80	1.09	90	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	555.48	261.28	100	1.00	0.90	1.33	1.05	126	0.62	78	24.28	4.21	1.11	90	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-(-02)
Chainage	0+499

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Greyish to Brownish Gray, fine-grained silty sand (SM)	0.00	6.25	15.95	6.14
2	Medium Dense, Brownish Gray, fine-grained silty sand (SM)	6.25	11.25	17.55	7.74
3	Dense, Brownish to Greyish, fine-grained silty sand (SM)	11.25	16.00	18.50	8.69
4	Very Dense, Gray Brownish to Brownish, fine-grained silty sand (SM)	16.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	19.94	7.68	6	0.75	0.90	1.33	1.05	6	1.70	10	26.27	4.41	1.12	15	0.16	1.00	0.06	0.80	1.67	1.00	0.27	0.99	0.401	0.68	Liquefiable Soil
2	2.50	4.00	3.25	51.84	19.97	7	0.80	0.90	1.33	1.05	7	1.70	12	20.30	3.67	1.08	17	0.18	1.00	0.11	0.80	1.38	1.00	0.24	0.98	0.395	0.62	Liquefiable Soil
3	4.00	5.50	4.75	75.76	29.18	9	0.85	0.90	1.33	1.05	10	1.70	16	21.64	3.87	1.09	22	0.24	1.00	0.17	0.80	1.28	1.00	0.30	0.96	0.390	0.78	Liquefiable Soil
4	5.50	7.00	6.25	99.69	38.40	12	0.95	0.90	1.33	1.05	14	1.61	23	21.64	3.87	1.09	29	0.41	1.00	0.25	0.80	1.21	1.00	0.50	0.95	0.386	1.30	Non Liquefiable Soil
5	7.00	8.50	7.75	126.01	50.01	16	0.95	0.90	1.33	1.05	19	1.41	27	19.04	3.44	1.07	32	NL	1.00	0.32	0.80	1.15	1.00	NL	0.94	0.370	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	152.34	61.63	23	0.95	0.90	1.33	1.05	27	1.27	35	19.04	3.44	1.07	41	NL	1.00	0.45	0.77	1.12	1.00	NL	0.93	0.358	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	178.66	73.24	26	1.00	0.90	1.33	1.05	33	1.17	38	30.40	4.73	1.16	49	NL	1.00	0.53	0.73	1.09	1.00	NL	0.89	0.338	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	205.94	85.81	34	1.00	0.90	1.33	1.05	43	1.08	46	25.45	4.33	1.12	56	NL	1.00	0.85	0.60	1.06	1.00	NL	0.85	0.317	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	233.69	98.85	44	1.00	0.90	1.33	1.05	55	1.01	56	23.39	4.11	1.10	65	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.298	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	261.44	111.89	48	1.00	0.90	1.33	1.05	60	0.95	57	25.28	4.32	1.12	68	NL	1.00	0.85	0.60	0.96	1.00	NL	0.77	0.280	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	290.31	126.05	54	1.00	0.90	1.33	1.05	68	0.89	60	21.75	3.89	1.09	70	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.261	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	320.31	141.34	63	1.00	0.90	1.33	1.05	79	0.84	67	17.92	3.22	1.07	74	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.243	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	350.31	156.63	68	1.00	0.90	1.33	1.05	85	0.80	68	30.77	4.76	1.16	84	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.226	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	380.31	171.92	74	1.00	0.90	1.33	1.05	93	0.76	71	20.28	3.66	1.08	80	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.209	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	410.31	187.21	80	1.00	0.90	1.33	1.05	101	0.73	73	22.53	4.00	1.10	85	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.194	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	440.31	202.50	100	1.00	0.90	1.33	1.05	126	0.70	88	11.68	1.44	1.03	92	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	470.31	217.79	100	1.00	0.90	1.33	1.05	126	0.68	85	28.23	4.58	1.14	102	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	500.31	233.08	100	1.00	0.90	1.33	1.05	126	0.66	82	10.70	1.11	1.03	85	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	535.31	250.92	100	1.00	0.90	1.33	1.05	126	0.63	79	18.19	3.27	1.07	88	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	555.31	261.11	100	1.00	0.90	1.33	1.05	126	0.62	78	10.60	1.07	1.02	81	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

B.2. Zone 2: CH: 0+500 km to 1+450 km (BH-01 to BH-09)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-02	0.00	2.50	6	6	10	14	0.25	0.37	0.68	Liquefiable Soil
BH-02	2.50	4.00	7	7	12	17	0.25	0.36	0.69	Liquefiable Soil
BH-02	4.00	5.50	8	9	15	20	0.27	0.36	0.77	Liquefiable Soil
BH-02	5.50	7.00	12	14	21	26	0.36	0.35	1.03	Liquefiable Soil
BH-03	0.00	2.50	4	4	6	11	0.20	0.37	0.55	Liquefiable Soil
BH-03	2.50	4.00	7	7	12	17	0.25	0.36	0.69	Liquefiable Soil
BH-03	4.00	5.50	10	11	18	24	0.33	0.36	0.93	Liquefiable Soil
BH-04	0.00	2.50	5	5	8	14	0.24	0.37	0.66	Liquefiable Soil
BH-04	2.50	4.00	8	8	14	20	0.29	0.36	0.80	Liquefiable Soil
BH-04	4.00	5.50	10	11	18	25	0.36	0.36	1.00	Liquefiable Soil
BH-05	0.00	2.50	5	5	8	10	0.18	0.37	0.51	Liquefiable Soil
BH-05	2.50	4.00	7	7	12	15	0.21	0.36	0.59	Liquefiable Soil
BH-05	4.00	5.50	9	10	16	20	0.27	0.36	0.76	Liquefiable Soil
BH-05	5.50	7.00	12	14	21	26	0.37	0.35	1.06	Liquefiable Soil
BH-06	0.00	2.50	6	6	10	16	0.27	0.37	0.74	Liquefiable Soil
BH-06	2.50	4.00	7	7	12	17	0.25	0.36	0.68	Liquefiable Soil
BH-06	4.00	5.50	9	10	16	22	0.29	0.36	0.83	Liquefiable Soil
BH-07	0.00	2.50	9	8	14	19	0.33	0.37	0.90	Liquefiable Soil
BH-08	0.00	2.50	5	5	8	12	0.21	0.37	0.59	Liquefiable Soil
BH-08	2.50	4.00	7	7	12	18	0.26	0.36	0.71	Liquefiable Soil
BH-08	4.00	5.50	10	11	18	25	0.36	0.36	1.02	Liquefiable Soil
BH-09	0.00	2.50	7	7	11	16	0.28	0.37	0.77	Liquefiable Soil
BH-09	2.50	4.00	10	10	17	23	0.34	0.36	0.95	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-01
Chainage	0+571

Density Profile								
Sr No.	Layer Discription				from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Grayish, fine-grained silty sand (SM)				0.00	7.00	17.00	7.19
2	Dense, Dark Brownish, fine-grained silty sand with Gravel (SM)				7.00	18.25	19.00	9.19
3	Very Dense, Lite Brownish, fine-grained silty sand (SM)				18.25	23.25	20.00	10.19
4	Very Dense, Dark Brownish, fine-grained silty sand(SM)				23.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (Cn)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	12	0.75	0.90	1.33	1.05	11	1.70	19	22.40	3.98	1.10	25	0.29	1.00	0.20	0.80	1.62	1.00	0.47	0.99	0.365	1.30	Non Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	16	0.80	0.90	1.33	1.05	16	1.70	27	31.46	4.80	1.17	37	NL	1.00	0.27	0.80	1.34	1.00	NL	0.98	0.360	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	22	0.85	0.90	1.33	1.05	24	1.70	40	25.40	4.33	1.12	49	NL	1.00	0.39	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	25	0.95	0.90	1.33	1.05	30	1.49	45	38.50	0.50	1.20	54	NL	1.00	0.49	0.76	1.22	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.25	57.25	32	0.95	0.90	1.33	1.05	38	1.32	50	20.77	3.74	1.08	59	NL	1.00	0.62	0.69	1.19	1.00	NL	0.94	0.342	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	161.75	71.04	34	0.95	0.90	1.33	1.05	41	1.19	48	20.77	3.74	1.08	56	NL	1.00	0.85	0.60	1.15	1.00	NL	0.93	0.330	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	190.25	84.83	39	1.00	0.90	1.33	1.05	49	1.09	53	27.64	4.53	1.14	65	NL	1.00	0.85	0.60	1.07	1.00	NL	0.89	0.310	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.75	98.62	41	1.00	0.90	1.33	1.05	52	1.01	52	29.60	4.68	1.15	64	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.293	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.25	112.41	45	1.00	0.90	1.33	1.05	57	0.94	53	26.97	4.48	1.13	65	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.277	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	275.75	126.20	47	1.00	0.90	1.33	1.05	59	0.89	53	30.78	4.76	1.16	66	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.261	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	304.25	139.99	50	1.00	0.90	1.33	1.05	63	0.85	53	25.22	4.31	1.12	64	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.246	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	332.75	153.78	55	1.00	0.90	1.33	1.05	69	0.81	56	34.95	4.98	1.20	72	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.232	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	362.75	169.07	60	1.00	0.90	1.33	1.05	75	0.77	58	30.58	4.74	1.16	72	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.216	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	392.75	184.36	67	1.00	0.90	1.33	1.05	84	0.74	62	31.35	4.79	1.17	77	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.202	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	422.75	199.65	74	1.00	0.90	1.33	1.05	93	0.71	66	30.76	4.75	1.16	81	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.187	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	452.75	214.94	100	1.00	0.90	1.33	1.05	126	0.68	86	19.22	3.48	1.07	96	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	482.75	230.23	100	1.00	0.90	1.33	1.05	126	0.66	83	29.85	4.70	1.15	100	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.159	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	512.75	245.52	100	1.00	0.90	1.33	1.05	126	0.64	80	27.60	4.53	1.13	96	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.145	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	547.75	263.36	100	1.00	0.90	1.33	1.05	126	0.62	77	28.92	4.63	1.15	93	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	567.75	273.55	100	1.00	0.90	1.33	1.05	126	0.60	76	25.51	4.34	1.12	89	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-02
Chainage	0+674

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Grayish, fine-grained silty sand (SM)	0.00	6.25	17.00	7.19
2	Medium Dense to Dense, Brownish Gray, fine-grained silty sand with Gravel (SM)	6.25	14.25	17.00	7.19
3	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand with Gravel(M	14.25	17.25	18.90	9.09
4	Dense to Very Dense, Brownish to yellowish, fine-grained silty sand with Gravel(SM)	17.25	24.25	19.50	9.69
5	Very Dense, Brownish, fine-grained silty sand with gravel(SM)	24.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	6	0.75	0.90	1.33	1.05	6	1.70	10	21.90	3.91	1.09	14	0.15	1.00	0.06	0.80	1.62	1.00	0.25	0.99	0.365	0.68	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	7	0.80	0.90	1.33	1.05	7	1.70	12	24.22	4.20	1.11	17	0.19	1.00	0.11	0.80	1.34	1.00	0.25	0.98	0.360	0.69	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	8	0.85	0.90	1.33	1.05	9	1.70	15	24.24	4.21	1.11	20	0.22	1.00	0.16	0.80	1.24	1.00	0.27	0.96	0.355	0.77	Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	12	0.95	0.90	1.33	1.05	14	1.49	21	17.42	3.11	1.06	26	0.31	1.00	0.25	0.80	1.17	1.00	0.36	0.95	0.351	1.03	Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	17	0.95	0.90	1.33	1.05	20	1.34	27	23.96	4.17	1.11	34	NL	1.00	0.34	0.80	1.12	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	22	0.95	0.90	1.33	1.05	26	1.23	32	33.53	4.91	1.18	43	NL	1.00	0.43	0.78	1.09	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	182.75	77.33	29	1.00	0.90	1.33	1.05	36	1.14	41	30.15	4.72	1.16	53	NL	1.00	0.59	0.70	1.08	1.00	NL	0.89	0.327	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.25	88.12	36	1.00	0.90	1.33	1.05	45	1.07	48	30.15	4.72	1.16	60	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.312	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	233.75	98.91	43	1.00	0.90	1.33	1.05	54	1.01	54	66.98	0.50	1.20	66	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.297	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	261.15	111.60	39	1.00	0.90	1.33	1.05	49	0.95	46	19.62	3.55	1.08	54	NL	1.00	0.85	0.60	0.96	1.00	NL	0.77	0.280	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	289.50	125.24	42	1.00	0.90	1.33	1.05	53	0.89	47	25.40	4.33	1.12	57	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.262	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	318.45	139.48	44	1.00	0.90	1.33	1.05	55	0.85	47	19.63	3.55	1.08	54	NL	1.00	0.85	0.60	0.88	2.00	NL	0.69	0.245	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	347.70	154.02	54	1.00	0.90	1.33	1.05	68	0.81	55	30.98	4.77	1.16	68	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.228	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	376.95	168.56	66	1.00	0.90	1.33	1.05	83	0.77	64	27.63	4.53	1.14	77	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.212	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	406.20	183.10	77	1.00	0.90	1.33	1.05	97	0.74	72	30.82	4.76	1.16	88	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.196	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	435.45	197.64	100	1.00	0.90	1.33	1.05	126	0.71	89	23.12	4.07	1.10	103	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.181	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	465.45	212.93	100	1.00	0.90	1.33	1.05	126	0.69	86	23.39	4.11	1.10	99	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.166	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	495.45	228.22	100	1.00	0.90	1.33	1.05	126	0.66	83	16.81	2.97	1.06	91	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.151	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	530.45	246.06	100	1.00	0.90	1.33	1.05	126	0.64	80	28.17	4.57	1.14	96	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	550.45	256.25	100	1.00	0.90	1.33	1.05	126	0.62	79	27.69	4.54	1.14	94	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.125	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-03
Chainage	0+892

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Grayish, fine-grained silty sand (SM)	0.00	6.25	17.00	7.19
2	Medium Dense, Dark Grey to brownish, fine-grained silty sand (SM)	6.25	10.00	17.00	7.19
3	Dense, Dark Brownish, fine-grained silty sand (SM)	10.00	15.25	19.00	9.19
4	Very Dense, Dark Greyish, fine-grained silty sand (SM)	15.25	22.00	20.00	10.19
5	Very Dense, Grayish to dark Brownish, fine-grained silty sand with gravel(SM)	22.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (Cn)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	4	0.75	0.90	1.33	1.05	4	1.70	6	23.54	4.13	1.10	11	0.12	1.00	0.00	0.80	1.62	1.00	0.20	0.99	0.365	0.55	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	7	0.80	0.90	1.33	1.05	7	1.70	12	23.54	4.13	1.10	17	0.18	1.00	0.11	0.80	1.34	1.00	0.25	0.98	0.360	0.69	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	10	0.85	0.90	1.33	1.05	11	1.70	18	21.28	3.82	1.09	24	0.27	1.00	0.19	0.80	1.24	1.00	0.33	0.96	0.355	0.93	Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	13	0.95	0.90	1.33	1.05	16	1.49	23	21.28	3.82	1.09	29	0.41	1.00	0.27	0.80	1.17	1.00	0.48	0.95	0.351	1.37	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	18	0.95	0.90	1.33	1.05	21	1.34	29	30.76	4.75	1.16	38	NL	1.00	0.36	0.80	1.12	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	26	0.95	0.90	1.33	1.05	31	1.23	38	23.60	4.13	1.10	46	NL	1.00	0.51	0.75	1.11	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.25	78.83	32	1.00	0.90	1.33	1.05	40	1.13	45	17.22	3.06	1.06	51	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.75	92.62	40	1.00	0.90	1.33	1.05	50	1.04	52	26.91	4.47	1.13	63	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.25	106.41	44	1.00	0.90	1.33	1.05	55	0.97	54	26.46	4.43	1.13	65	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.75	120.20	55	1.00	0.90	1.33	1.05	69	0.91	63	25.00	4.29	1.12	75	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	299.75	135.49	42	1.00	0.90	1.33	1.05	53	0.86	45	26.20	4.41	1.12	55	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	329.75	150.78	44	1.00	0.90	1.33	1.05	55	0.81	45	33.19	4.89	1.18	58	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	359.75	166.07	54	1.00	0.90	1.33	1.05	68	0.78	53	27.20	4.50	1.13	64	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.219	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.75	181.36	66	1.00	0.90	1.33	1.05	83	0.74	62	32.92	4.88	1.18	77	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	419.75	196.65	100	1.00	0.90	1.33	1.05	126	0.71	90	29.63	4.68	1.15	108	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	449.75	211.94	100	1.00	0.90	1.33	1.05	126	0.69	86	23.14	4.08	1.10	99	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	479.75	227.23	100	1.00	0.90	1.33	1.05	126	0.66	83	20.80	3.75	1.08	94	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	509.75	242.52	100	1.00	0.90	1.33	1.05	126	0.64	81	21.31	3.83	1.09	92	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	544.75	260.36	100	1.00	0.90	1.33	1.05	126	0.62	78	26.06	4.39	1.12	92	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	564.75	270.55	100	1.00	0.90	1.33	1.05	126	0.61	76	23.41	4.11	1.10	88	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-04
Chainage	0+996

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Grayish, fine-grained silty sand (SM)	0.00	6.25	17.00	7.19
2	Medium Dense, Dark brownish, fine-grained silty sand (SM)	6.25	12.25	17.00	7.19
3	Dense, Dark Brownish, fine-grained silty sand (SM)	12.25	15.25	19.00	9.19
4	Dense to very dense, Brownish, fine-grained silty sand with Gravel (SM)	15.25	21.25	19.50	9.69
5	Very Dense, Dark Brownish, fine-grained silty sand with gravel(SM)	21.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	5	0.75	0.90	1.33	1.05	5	1.70	8	29.42	4.67	1.15	14	0.15	1.00	0.03	0.80	1.62	1.00	0.24	0.99	0.365	0.66	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	8	0.80	0.90	1.33	1.05	8	1.70	14	27.13	4.49	1.13	20	0.21	1.00	0.15	0.80	1.34	1.00	0.29	0.98	0.360	0.80	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	10	0.85	0.90	1.33	1.05	11	1.70	18	26.06	4.39	1.12	25	0.29	1.00	0.19	0.80	1.24	1.00	0.36	0.96	0.355	1.00	Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	12	0.95	0.90	1.33	1.05	14	1.49	21	26.60	4.44	1.13	29	0.39	1.00	0.25	0.80	1.17	1.00	0.46	0.95	0.351	1.30	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	19	0.95	0.90	1.33	1.05	23	1.34	30	27.14	4.49	1.13	39	NL	1.00	0.38	0.80	1.12	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	26	0.95	0.90	1.33	1.05	31	1.23	38	27.63	4.53	1.14	48	NL	1.00	0.51	0.75	1.11	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	182.75	77.33	29	1.00	0.90	1.33	1.05	36	1.14	41	27.63	4.53	1.14	52	NL	1.00	0.59	0.70	1.08	1.00	NL	0.89	0.327	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.25	88.12	46	1.00	0.90	1.33	1.05	58	1.07	62	27.00	4.48	1.13	74	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.312	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	236.75	101.91	44	1.00	0.90	1.33	1.05	55	0.99	55	27.64	4.53	1.14	67	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.292	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	265.25	115.70	54	1.00	0.90	1.33	1.05	68	0.93	63	23.22	4.09	1.10	74	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.274	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	294.50	130.24	57	1.00	0.90	1.33	1.05	72	0.88	63	21.83	3.90	1.09	72	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.256	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	323.75	144.78	40	1.00	0.90	1.33	1.05	50	0.83	42	23.18	4.08	1.10	50	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.240	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	353.00	159.32	46	1.00	0.90	1.33	1.05	58	0.79	46	22.70	4.02	1.10	54	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.224	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	382.25	173.86	87	1.00	0.90	1.33	1.05	109	0.76	83	24.10	4.19	1.11	96	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.208	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	412.25	189.15	100	1.00	0.90	1.33	1.05	126	0.73	91	19.10	3.45	1.07	102	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.193	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	442.25	204.44	100	1.00	0.90	1.33	1.05	126	0.70	88	27.40	4.51	1.13	104	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	472.25	219.73	100	1.00	0.90	1.33	1.05	126	0.67	85	23.71	4.15	1.11	98	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	502.25	235.02	100	1.00	0.90	1.33	1.05	126	0.65	82	26.13	4.40	1.12	97	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.25	252.86	100	1.00	0.90	1.33	1.05	126	0.63	79	26.96	4.48	1.13	94	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	557.25	263.05	100	1.00	0.90	1.33	1.05	126	0.62	77	27.74	4.54	1.14	93	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-05
Chainage	1+088

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Grayish, fine-grained silty sand (SM)	0.00	6.25	17.00	7.19
2	Medium Dense, Dark Grayish, fine-grained silty sand (SM)	6.25	10.00	17.00	7.19
3	Dense, Dark Gray to Brownish gray, fine-grained silty sand (SM)	10.00	15.25	19.00	9.19
4	Hard, Brownish gray to little brownish, fine-grained inorganic silt of low	15.25	20.25	18.90	9.09
5	Very Dense, Brownish gray to dark brownish, fine-grained silty sa	20.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	5	0.75	0.90	1.33	1.05	5	1.70	8	74.05	0.50	1.20	10	0.11	1.00	0.03	0.80	1.62	1.00	0.18	0.99	0.365	0.51	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	7	0.80	0.90	1.33	1.05	7	1.70	12	74.05	0.50	1.20	15	0.16	1.00	0.11	0.80	1.34	1.00	0.21	0.98	0.360	0.59	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	9	0.85	0.90	1.33	1.05	10	1.70	16	72.82	0.50	1.20	20	0.22	1.00	0.17	0.80	1.24	1.00	0.27	0.96	0.355	0.76	Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	12	0.95	0.90	1.33	1.05	14	1.49	21	72.82	0.50	1.20	26	0.32	1.00	0.25	0.80	1.17	1.00	0.37	0.95	0.351	1.06	Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	19	0.95	0.90	1.33	1.05	23	1.34	30	19.83	3.59	1.08	36	NL	1.00	0.38	0.80	1.12	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	27	0.95	0.90	1.33	1.05	32	1.23	40	34.31	4.95	1.19	52	NL	1.00	0.53	0.74	1.11	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.25	78.83	33	1.00	0.90	1.33	1.05	41	1.13	47	30.50	4.74	1.16	59	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.75	92.62	37	1.00	0.90	1.33	1.05	47	1.04	48	36.60	0.50	1.20	58	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.25	106.41	44	1.00	0.90	1.33	1.05	55	0.97	54	30.40	4.73	1.16	67	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.75	120.20	55	1.00	0.90	1.33	1.05	69	0.91	63	34.80	4.97	1.20	80	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	298.10	133.84	66	1.00	0.90	1.33	1.05	83	0.86	72	74.49	0.50	1.20	87	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.253	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	326.45	147.48	54	1.00	0.90	1.33	1.05	68	0.82	56	71.69	0.50	1.20	68	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.237	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	354.80	161.12	57	1.00	0.90	1.33	1.05	72	0.79	56	73.28	0.50	1.20	68	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.222	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	384.25	175.86	78	1.00	0.90	1.33	1.05	98	0.75	74	53.62	0.50	1.20	89	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	414.25	191.15	87	1.00	0.90	1.33	1.05	109	0.72	79	30.18	4.72	1.16	96	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	444.25	206.44	100	1.00	0.90	1.33	1.05	126	0.70	87	24.67	4.25	1.11	102	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	474.25	221.73	100	1.00	0.90	1.33	1.05	126	0.67	84	20.18	3.65	1.08	95	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.25	237.02	100	1.00	0.90	1.33	1.05	126	0.65	82	25.80	4.37	1.12	96	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	539.25	254.86	100	1.00	0.90	1.33	1.05	126	0.63	79	26.55	4.44	1.13	93	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	559.25	265.05	100	1.00	0.90	1.33	1.05	126	0.61	77	20.33	3.67	1.08	87	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-06
Chainage	1+192

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Greyish, fine-grained silty sand (SM)	0.00	5.25	17.00	7.19
2	Medium dense, Brownish, fine-grained silty sand with gravel (SM)	5.25	8.25	17.00	7.19
3	Dense, Brownish grey to Little Yellowish fine-grained silty sand with grav	8.25	18.25	19.00	9.19
4	Very Dense, yellowish to Brownish grey, fine-grained silty sand with grav	18.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	6	0.75	0.90	1.33	1.05	6	1.70	10	29.86	4.70	1.15	16	0.17	1.00	0.06	0.80	1.62	1.00	0.27	0.99	0.365	0.74	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	7	0.80	0.90	1.33	1.05	7	1.70	12	23.08	4.07	1.10	17	0.18	1.00	0.11	0.80	1.34	1.00	0.25	0.98	0.360	0.68	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	9	0.85	0.90	1.33	1.05	10	1.70	16	21.71	3.88	1.09	22	0.24	1.00	0.17	0.80	1.24	1.00	0.29	0.96	0.355	0.83	Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	12	0.95	0.90	1.33	1.05	14	1.49	21	25.44	4.33	1.12	28	0.38	1.00	0.25	0.80	1.17	1.00	0.44	0.95	0.351	1.26	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	19	0.95	0.90	1.33	1.05	23	1.34	30	20.66	3.72	1.08	37	NL	1.00	0.38	0.80	1.12	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.25	68.54	31	0.95	0.90	1.33	1.05	37	1.21	45	20.66	3.72	1.08	52	NL	1.00	0.60	0.70	1.12	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.75	82.33	33	1.00	0.90	1.33	1.05	41	1.10	46	23.70	4.14	1.11	55	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.316	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	216.25	96.12	41	1.00	0.90	1.33	1.05	52	1.02	53	32.00	4.83	1.17	66	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.297	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.75	109.91	44	1.00	0.90	1.33	1.05	55	0.95	53	32.00	4.83	1.17	67	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.280	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	273.25	123.70	34	1.00	0.90	1.33	1.05	43	0.90	38	32.39	4.85	1.17	50	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.264	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	301.75	137.49	42	1.00	0.90	1.33	1.05	53	0.85	45	29.81	4.69	1.15	57	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.249	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.25	151.28	52	1.00	0.90	1.33	1.05	65	0.81	53	27.75	4.54	1.14	65	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.25	166.57	52	1.00	0.90	1.33	1.05	65	0.77	51	30.00	4.71	1.15	63	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.25	181.86	65	1.00	0.90	1.33	1.05	82	0.74	61	34.44	4.95	1.19	77	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.25	197.15	73	1.00	0.90	1.33	1.05	92	0.71	65	27.72	4.54	1.14	79	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	450.25	212.44	78	1.00	0.90	1.33	1.05	98	0.69	67	30.98	4.77	1.16	83	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.25	227.73	100	1.00	0.90	1.33	1.05	126	0.66	83	26.40	4.43	1.13	98	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	510.25	243.02	100	1.00	0.90	1.33	1.05	126	0.64	81	28.68	4.61	1.14	97	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	545.25	260.86	100	1.00	0.90	1.33	1.05	126	0.62	78	31.30	4.79	1.17	95	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	565.25	271.05	100	1.00	0.90	1.33	1.05	126	0.61	76	22.71	4.02	1.10	88	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-07
Chainage	1+277

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Greyish, fine-grained silty sand (SM)	0.00	10.00	17.00	7.19
2	Dense, Brownish grey fine-grained silty sand (SM)	10.00	15.25	19.00	9.19
3	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand w	15.25	21.25	18.90	9.09
4	Very Dense, Dark Brownish, fine-grained silty sand with gravel (SM)	21.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	9	0.75	0.90	1.33	1.05	8	1.70	14	19.09	3.45	1.07	19	0.20	1.00	0.16	0.80	1.62	1.00	0.33	0.99	0.365	0.90	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	13	0.80	0.90	1.33	1.05	13	1.70	22	31.77	4.82	1.17	31	NL	1.00	0.23	0.80	1.34	1.00	NL	0.98	0.360	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	16	0.85	0.90	1.33	1.05	17	1.70	29	23.57	4.13	1.10	36	NL	1.00	0.29	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	25	0.95	0.90	1.33	1.05	30	1.49	45	24.60	4.25	1.11	54	NL	1.00	0.49	0.76	1.22	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	28	0.95	0.90	1.33	1.05	33	1.34	45	20.52	3.70	1.08	52	NL	1.00	0.55	0.73	1.17	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	27	0.95	0.90	1.33	1.05	32	1.23	40	20.52	3.70	1.08	47	NL	1.00	0.53	0.74	1.11	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.25	78.83	33	1.00	0.90	1.33	1.05	41	1.13	47	24.99	4.29	1.11	56	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.75	92.62	39	1.00	0.90	1.33	1.05	49	1.04	51	24.99	4.29	1.11	61	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.25	106.41	41	1.00	0.90	1.33	1.05	52	0.97	50	29.10	4.64	1.15	62	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.75	120.20	70	1.00	0.90	1.33	1.05	88	0.91	80	23.35	4.10	1.10	93	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	298.10	133.84	78	1.00	0.90	1.33	1.05	98	0.86	85	65.66	0.50	1.20	102	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.253	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	326.45	147.48	73	1.00	0.90	1.33	1.05	92	0.82	76	36.64	0.50	1.20	91	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.237	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	354.80	161.12	81	1.00	0.90	1.33	1.05	102	0.79	80	69.56	0.50	1.20	97	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.222	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	383.15	174.76	100	1.00	0.90	1.33	1.05	126	0.76	95	59.30	0.50	1.20	115	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	413.15	190.05	100	1.00	0.90	1.33	1.05	126	0.73	91	24.14	4.20	1.11	105	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	443.15	205.34	100	1.00	0.90	1.33	1.05	126	0.70	88	26.28	4.41	1.12	103	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	473.15	220.63	100	1.00	0.90	1.33	1.05	126	0.67	85	19.64	3.55	1.08	95	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	503.15	235.92	100	1.00	0.90	1.33	1.05	126	0.65	82	20.26	3.66	1.08	92	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	538.15	253.76	100	1.00	0.90	1.33	1.05	126	0.63	79	27.42	4.51	1.13	94	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	558.15	263.95	100	1.00	0.90	1.33	1.05	126	0.62	77	17.19	3.06	1.06	85	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-08
Chainage	1+388

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Grayish, fine-grained silty sand (SM)	0.00	6.25	17.00	7.19
2	Medium Dense, Brownish, fine-grained silty sand with Gravel (SM)	6.25	10.00	17.00	7.19
3	Dense, Dark Brownish fine-grained silty sand (SM)	10.00	15.25	19.00	9.19
4	Very Dense, Brownish to Yellowish, fine-grained silty sand with gravel(SM)	15.25	24.25	20.00	10.19
5	Very Dense, Yellowish to Brownish, fine-grained silty sand with gravel (SM)	24.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	5	0.75	0.90	1.33	1.05	5	1.70	8	19.41	3.51	1.08	12	0.13	1.00	0.03	0.80	1.62	1.00	0.21	0.99	0.365	0.59	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	7	0.80	0.90	1.33	1.05	7	1.70	12	26.53	4.44	1.13	18	0.19	1.00	0.11	0.80	1.34	1.00	0.26	0.98	0.360	0.71	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	10	0.85	0.90	1.33	1.05	11	1.70	18	26.86	4.47	1.13	25	0.29	1.00	0.19	0.80	1.24	1.00	0.36	0.96	0.355	1.02	Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	12	0.95	0.90	1.33	1.05	14	1.49	21	26.46	4.43	1.13	28	0.39	1.00	0.25	0.80	1.17	1.00	0.46	0.95	0.351	1.30	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	17	0.95	0.90	1.33	1.05	20	1.34	27	27.68	4.54	1.14	35	NL	1.00	0.34	0.80	1.12	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	24	0.95	0.90	1.33	1.05	29	1.23	35	30.88	4.76	1.16	46	NL	1.00	0.47	0.76	1.10	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.25	78.83	32	1.00	0.90	1.33	1.05	40	1.13	45	30.88	4.76	1.16	57	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.75	92.62	40	1.00	0.90	1.33	1.05	50	1.04	52	20.60	3.71	1.08	60	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.25	106.41	46	1.00	0.90	1.33	1.05	58	0.97	56	31.42	4.79	1.17	70	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.75	120.20	53	1.00	0.90	1.33	1.05	67	0.91	61	16.27	2.84	1.06	67	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	299.75	135.49	55	1.00	0.90	1.33	1.05	69	0.86	59	17.85	3.20	1.07	66	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	329.75	150.78	69	1.00	0.90	1.33	1.05	87	0.81	71	11.70	1.45	1.03	74	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	359.75	166.07	75	1.00	0.90	1.33	1.05	94	0.78	73	26.50	4.43	1.13	87	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.219	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.75	181.36	100	1.00	0.90	1.33	1.05	126	0.74	93	15.62	2.67	1.05	101	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	419.75	196.65	100	1.00	0.90	1.33	1.05	126	0.71	90	26.85	4.47	1.13	106	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	449.75	211.94	100	1.00	0.90	1.33	1.05	126	0.69	86	18.88	3.41	1.07	96	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	479.75	227.23	100	1.00	0.90	1.33	1.05	126	0.66	83	30.71	4.75	1.16	101	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	509.75	242.52	100	1.00	0.90	1.33	1.05	126	0.64	81	19.73	3.57	1.08	91	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	544.75	260.36	100	1.00	0.90	1.33	1.05	126	0.62	78	25.70	4.36	1.12	92	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	564.75	270.55	100	1.00	0.90	1.33	1.05	126	0.61	76	17.20	3.06	1.06	84	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-09
Chainage	1+449

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Grayish, fine-grained silty sand (SM)	0.00	4.00	17.00	7.19
2	Medium Dense,Gray to dark Grayish, fine-grained silty sand (SM)	4.00	10.00	17.00	7.19
3	Dense, Brownish fine-grained silty sand (SM)	10.00	15.25	19.00	9.19
4	Very Dense, Brownish to Greyish, fine-grained silty sand with gravel(SM)	15.25	30.50	20.00	10.19
5					

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	7	0.75	0.90	1.33	1.05	7	1.70	11	22.89	4.04	1.10	16	0.17	1.00	0.10	0.80	1.62	1.00	0.28	0.99	0.365	0.77	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	10	0.80	0.90	1.33	1.05	10	1.70	17	22.89	4.04	1.10	23	0.25	1.00	0.18	0.80	1.34	1.00	0.34	0.98	0.360	0.95	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	13	0.85	0.90	1.33	1.05	14	1.70	24	17.46	3.12	1.06	28	0.38	1.00	0.24	0.80	1.24	1.00	0.47	0.96	0.355	1.32	Non Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	16	0.95	0.90	1.33	1.05	19	1.49	28	20.56	3.71	1.08	35	NL	1.00	0.32	0.80	1.17	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	22	0.95	0.90	1.33	1.05	26	1.34	35	20.56	3.71	1.08	42	NL	1.00	0.43	0.78	1.13	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	29	0.95	0.90	1.33	1.05	35	1.23	42	24.84	4.27	1.11	52	NL	1.00	0.57	0.72	1.12	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.25	78.83	37	1.00	0.90	1.33	1.05	47	1.13	52	18.34	3.30	1.07	59	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.75	92.62	41	1.00	0.90	1.33	1.05	52	1.04	54	18.80	3.40	1.07	61	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.25	106.41	48	1.00	0.90	1.33	1.05	60	0.97	58	26.15	4.40	1.12	70	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.75	120.20	55	1.00	0.90	1.33	1.05	69	0.91	63	27.62	4.53	1.14	76	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	299.75	135.49	63	1.00	0.90	1.33	1.05	79	0.86	68	23.36	4.10	1.10	79	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	329.75	150.78	74	1.00	0.90	1.33	1.05	93	0.81	76	24.00	4.18	1.11	88	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	359.75	166.07	77	1.00	0.90	1.33	1.05	97	0.78	75	19.23	3.48	1.07	84	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.219	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.75	181.36	79	1.00	0.90	1.33	1.05	99	0.74	74	8.95	0.54	1.02	76	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	419.75	196.65	100	1.00	0.90	1.33	1.05	126	0.71	90	21.37	3.83	1.09	101	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	449.75	211.94	100	1.00	0.90	1.33	1.05	126	0.69	86	9.87	0.83	1.02	89	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	479.75	227.23	100	1.00	0.90	1.33	1.05	126	0.66	83	18.60	3.36	1.07	93	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	509.75	242.52	100	1.00	0.90	1.33	1.05	126	0.64	81	10.87	1.16	1.03	84	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	544.75	260.36	100	1.00	0.90	1.33	1.05	126	0.62	78	16.81	2.97	1.06	85	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	564.75	270.55	100	1.00	0.90	1.33	1.05	126	0.61	76	8.10	0.32	1.01	78	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

B.3. Zone 3: CH: 1+450 km to 2+515 km (BH-11 to BH-20A)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-11	0.00	2.50	5	5	8	12	0.21	0.37	0.58	Liquefiable Soil
BH-11	2.50	4.00	12	12	21	25	0.40	0.36	1.11	Liquefiable Soil
BH-12	0.00	2.50	7	7	11	17	0.30	0.38	0.79	Liquefiable Soil
BH-12	2.50	4.00	8	8	14	19	0.28	0.37	0.74	Liquefiable Soil
BH-12	4.00	5.50	10	11	18	25	0.38	0.37	1.01	Liquefiable Soil
BH-12	5.50	7.00	12	14	22	27	0.39	0.36	1.09	Liquefiable Soil
BH-13	0.00	2.50	9	8	14	19	0.33	0.37	0.92	Liquefiable Soil
BH-13	2.50	4.00	12	12	21	26	0.41	0.36	1.15	Liquefiable Soil
BH-14	0.00	2.50	6	6	10	12	0.21	0.34	0.61	Liquefiable Soil
BH-14	2.50	4.00	7	7	12	15	0.21	0.33	0.62	Liquefiable Soil
BH-14	4.00	5.50	7	7	12	15	0.19	0.33	0.58	Liquefiable Soil
BH-14	5.50	7.00	12	14	20	27	0.38	0.33	1.16	Liquefiable Soil
BH-14	8.50	10.00	17	20	23	28	0.38	0.32	1.20	Liquefiable Soil
BH-15	0.00	2.50	7	7	11	14	0.24	0.37	0.66	Liquefiable Soil
BH-15	2.50	4.00	12	12	21	25	0.40	0.37	1.08	Liquefiable Soil
BH-16	0.00	2.50	6	6	10	15	0.27	0.38	0.71	Liquefiable Soil
BH-16	2.50	4.00	7	7	12	18	0.27	0.37	0.71	Liquefiable Soil
BH-16	4.00	5.50	11	12	20	26	0.40	0.36	1.09	Liquefiable Soil
BH-16	5.50	7.00	12	14	21	27	0.39	0.35	1.11	Liquefiable Soil
BH-17	0.00	2.50	6	6	10	14	0.25	0.38	0.65	Liquefiable Soil
BH-17	2.50	4.00	9	9	15	19	0.28	0.37	0.75	Liquefiable Soil
BH-18	0.00	2.50	6	6	10	16	0.28	0.38	0.73	Liquefiable Soil
BH-18	2.50	4.00	9	9	15	23	0.35	0.38	0.91	Liquefiable Soil
BH-18A	0.00	2.50	6	6	10	16	0.28	0.38	0.74	Liquefiable Soil
BH-18A	2.50	4.00	9	9	15	21	0.32	0.37	0.84	Liquefiable Soil
BH-18A	4.00	5.50	11	12	20	27	0.42	0.36	1.16	Liquefiable Soil
BH-19	0.00	2.50	8	8	13	17	0.30	0.38	0.79	Liquefiable Soil

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	Fs_{liq}	Liquefaction Potential
BH-19	2.50	4.00	8	8	14	18	0.26	0.37	0.70	Liquefiable Soil
BH-19	4.00	5.50	10	11	18	26	0.39	0.37	1.06	Liquefiable Soil
BH-19A	0.00	2.50	8	8	13	18	0.32	0.37	0.87	Liquefiable Soil
BH-20	0.00	2.50	9	8	14	20	0.36	0.38	0.95	Liquefiable Soil
BH-20	2.50	4.00	9	9	15	19	0.28	0.37	0.75	Liquefiable Soil
BH-20A	0.00	2.50	6	6	10	12	0.21	0.37	0.58	Liquefiable Soil
BH-20A	2.50	4.00	7	7	12	15	0.21	0.37	0.58	Liquefiable Soil
BH-20A	4.00	5.50	9	10	16	20	0.27	0.36	0.75	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-11
Chainage	1+610

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish Gray to Brownish , fine-grained silty s	0.00	10.00	17.00	7.19
2	Dense, Brownish, fine-grained silty sand and Gravel(SM)	10.00	15.25	19.10	9.29
3	Very Dense, Brownish Gray, fine-grained silty sand and Gravel (SM)	15.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	5	0.75	0.90	1.33	1.05	5	1.70	8	18.92	3.42	1.07	12	0.13	1.00	0.03	0.80	1.62	1.00	0.21	0.99	0.365	0.58	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	12	0.80	0.90	1.33	1.05	12	1.70	21	18.69	3.37	1.07	25	0.30	1.00	0.21	0.80	1.34	1.00	0.40	0.98	0.360	1.11	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	16	0.85	0.90	1.33	1.05	17	1.70	29	30.89	4.76	1.16	39	NL	1.00	0.29	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	21	0.95	0.90	1.33	1.05	25	1.49	37	26.55	4.44	1.13	47	NL	1.00	0.41	0.79	1.18	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	25	0.95	0.90	1.33	1.05	30	1.34	40	26.62	4.45	1.13	50	NL	1.00	0.49	0.76	1.15	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	28	0.95	0.90	1.33	1.05	33	1.23	41	29.17	4.65	1.15	52	NL	1.00	0.55	0.73	1.12	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.33	78.90	34	1.00	0.90	1.33	1.05	43	1.13	48	21.11	3.79	1.09	56	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.98	92.84	45	1.00	0.90	1.33	1.05	57	1.04	59	27.45	4.52	1.13	71	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.63	106.78	47	1.00	0.90	1.33	1.05	59	0.97	57	23.80	4.16	1.11	67	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	270.28	120.72	51	1.00	0.90	1.33	1.05	64	0.91	58	27.14	4.49	1.13	70	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	300.28	136.01	59	1.00	0.90	1.33	1.05	74	0.86	64	21.78	3.89	1.09	73	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.250	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.28	151.30	81	1.00	0.90	1.33	1.05	102	0.81	83	24.62	4.25	1.11	96	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.28	166.59	87	1.00	0.90	1.33	1.05	109	0.77	85	26.77	4.46	1.13	100	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.28	181.88	45	1.00	0.90	1.33	1.05	57	0.74	42	27.44	4.52	1.13	52	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.28	197.17	100	1.00	0.90	1.33	1.05	126	0.71	90	28.35	4.59	1.14	107	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	450.28	212.46	100	1.00	0.90	1.33	1.05	126	0.69	86	21.33	3.83	1.09	98	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.28	227.75	100	1.00	0.90	1.33	1.05	126	0.66	83	21.91	3.91	1.09	95	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	510.28	243.04	100	1.00	0.90	1.33	1.05	126	0.64	81	28.74	4.62	1.14	97	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	545.28	260.88	100	1.00	0.90	1.33	1.05	126	0.62	78	22.21	3.95	1.09	89	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	565.28	271.08	100	1.00	0.90	1.33	1.05	126	0.61	76	26.72	4.45	1.13	91	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-12
Chainage	1+745

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Yellowish to Brownish, fine-grained silty sand and Gravel (SM)	0.00	5.25	16.50	6.69
2	Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand an	5.25	9.25	17.50	7.69
3	Medium Dense, Brownish, fine-grained silty sand and Gravel(SM)	9.25	12.25	16.40	6.59
4	Dense, Brownish Gray, fine-grained silty sand and Gravel(SM)	12.25	16.00	19.10	9.29
5	Very Dense, Brownish, fine-grained silty sand and Gravel(SM)	16.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mv}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	7	0.75	0.90	1.33	1.05	7	1.70	11	27.61	4.53	1.14	17	0.18	1.00	0.10	0.80	1.64	1.00	0.30	0.99	0.381	0.79	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	8	0.80	0.90	1.33	1.05	8	1.70	14	22.70	4.02	1.10	19	0.20	1.00	0.15	0.80	1.36	1.00	0.28	0.98	0.375	0.74	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	10	0.85	0.90	1.33	1.05	11	1.70	18	28.46	4.60	1.14	25	0.30	1.00	0.19	0.80	1.26	1.00	0.38	0.96	0.371	1.01	Liquefiable Soil
4	5.50	7.00	6.25	104.13	42.83	12	0.95	0.90	1.33	1.05	14	1.53	22	69.73	0.50	1.20	27	0.33	1.00	0.25	0.80	1.18	1.00	0.39	0.95	0.361	1.09	Liquefiable Soil
5	7.00	8.50	7.75	130.38	54.37	16	0.95	0.90	1.33	1.05	19	1.36	26	69.73	0.50	1.20	32	NL	1.00	0.32	0.80	1.13	1.00	NL	0.94	0.352	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	156.63	65.91	23	0.95	0.90	1.33	1.05	27	1.23	34	69.73	0.50	1.20	41	NL	1.00	0.45	0.77	1.10	1.00	NL	0.93	0.344	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	181.23	75.80	27	1.00	0.90	1.33	1.05	34	1.15	39	26.27	4.41	1.12	48	NL	1.00	0.55	0.72	1.08	1.00	NL	0.89	0.331	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	205.83	85.69	33	1.00	0.90	1.33	1.05	41	1.08	45	18.25	3.29	1.07	51	NL	1.00	0.85	0.60	1.06	1.00	NL	0.85	0.317	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	234.48	99.63	41	1.00	0.90	1.33	1.05	52	1.00	52	31.10	4.78	1.16	65	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.296	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	263.13	113.57	44	1.00	0.90	1.33	1.05	55	0.94	52	23.62	4.13	1.10	61	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.277	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	292.45	128.19	52	1.00	0.90	1.33	1.05	65	0.88	58	25.45	4.33	1.12	69	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.259	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	322.45	143.48	55	1.00	0.90	1.33	1.05	69	0.83	58	24.33	4.22	1.11	68	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.241	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	352.45	158.77	66	1.00	0.90	1.33	1.05	83	0.79	66	19.05	3.44	1.07	74	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.224	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	382.45	174.06	74	1.00	0.90	1.33	1.05	93	0.76	70	25.60	4.35	1.12	83	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.208	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	412.45	189.35	100	1.00	0.90	1.33	1.05	126	0.73	91	23.01	4.06	1.10	105	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.193	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	442.45	204.64	100	1.00	0.90	1.33	1.05	126	0.70	88	24.39	4.22	1.11	102	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	472.45	219.93	100	1.00	0.90	1.33	1.05	126	0.67	85	21.26	3.82	1.09	96	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	502.45	235.22	100	1.00	0.90	1.33	1.05	126	0.65	82	19.33	3.50	1.07	92	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.45	253.06	100	1.00	0.90	1.33	1.05	126	0.63	79	28.17	4.57	1.14	95	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	557.45	263.25	100	1.00	0.90	1.33	1.05	126	0.62	77	27.69	4.54	1.14	93	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-13
Chainage	1+859

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish Gray, fine-grained silty sand (SM)	0.00	5.25	17.00	7.19
2	Very Stiff, Greyish, fine-grained inorganic silt of low Plasticity with sand	5.25	8.25	18.00	8.19
3	Dense, Brownish Gray, fine-grained silty sand (SM)	8.25	16.00	19.10	9.29
4	Very Dense, Brownish Gray, fine-grained silty sand and Gravel (SM)	16.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	9	0.75	0.90	1.33	1.05	8	1.70	14	20.38	3.68	1.08	19	0.21	1.00	0.16	0.80	1.62	1.00	0.33	0.99	0.365	0.92	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	12	0.80	0.90	1.33	1.05	12	1.70	21	20.38	3.68	1.08	26	0.31	1.00	0.21	0.80	1.34	1.00	0.41	0.98	0.360	1.15	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	17	0.85	0.90	1.33	1.05	18	1.70	31	18.12	3.26	1.07	36	NL	1.00	0.31	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	107.25	45.96	21	0.95	0.90	1.33	1.05	25	1.48	37	64.09	0.50	1.20	45	NL	1.00	0.41	0.79	1.17	1.00	NL	0.95	0.347	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	134.25	58.25	25	0.95	0.90	1.33	1.05	30	1.31	39	64.09	0.50	1.20	47	NL	1.00	0.49	0.76	1.14	1.00	NL	0.94	0.338	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	162.35	71.64	29	0.95	0.90	1.33	1.05	35	1.18	41	30.00	4.71	1.15	52	NL	1.00	0.57	0.72	1.10	1.00	NL	0.93	0.329	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.00	85.58	37	1.00	0.90	1.33	1.05	47	1.08	50	25.01	4.29	1.12	60	NL	1.00	0.85	0.60	1.06	1.00	NL	0.89	0.309	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	219.65	99.52	40	1.00	0.90	1.33	1.05	50	1.00	50	28.74	4.62	1.14	62	NL	1.00	0.85	0.60	1.00	1.00	NL	0.85	0.292	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	248.30	113.46	43	1.00	0.90	1.33	1.05	54	0.94	51	21.18	3.81	1.09	59	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.275	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	276.95	127.40	46	1.00	0.90	1.33	1.05	58	0.89	51	19.05	3.44	1.07	58	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.260	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	306.28	142.01	52	1.00	0.90	1.33	1.05	65	0.84	55	29.80	4.69	1.15	68	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.245	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	336.28	157.30	55	1.00	0.90	1.33	1.05	69	0.80	55	27.52	4.52	1.13	67	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.229	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	366.28	172.59	68	1.00	0.90	1.33	1.05	85	0.76	65	29.00	4.64	1.15	79	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.214	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	396.28	187.88	77	1.00	0.90	1.33	1.05	97	0.73	71	21.95	3.92	1.09	81	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	426.28	203.17	100	1.00	0.90	1.33	1.05	126	0.70	88	25.84	4.37	1.12	103	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.185	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	456.28	218.46	100	1.00	0.90	1.33	1.05	126	0.68	85	23.82	4.16	1.11	98	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.172	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	486.28	233.75	100	1.00	0.90	1.33	1.05	126	0.65	82	17.25	3.07	1.06	90	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	516.28	249.04	100	1.00	0.90	1.33	1.05	126	0.63	80	19.83	3.59	1.08	89	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	551.28	266.88	100	1.00	0.90	1.33	1.05	126	0.61	77	25.96	4.38	1.12	91	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	571.28	277.08	100	1.00	0.90	1.33	1.05	126	0.60	76	14.30	2.30	1.04	81	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-14
Chainage	1+952

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Very Stiff, Greyish, fine-grained inorganic silt of low Plasticity with sand	0.00	5.25	18.00	8.19
2	Medium Dense, Greyish to Brownish Gray, fine-grained silty sand (SM)	5.25	12.25	17.75	7.94
3	Dense, Brownish Gray to Greyish, fine-grained silty sand (SM)	12.25	16.00	19.10	9.29
4	Very Dense, Brownish Gray, fine-grained silty sand and Gravel (SM)	16.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.50	10.24	6	0.75	0.90	1.33	1.05	6	1.70	10	71.96	0.50	1.20	12	0.13	1.00	0.06	0.80	1.58	1.00	0.21	0.99	0.339	0.61	Liquefiable Soil
2	2.50	4.00	3.25	58.50	26.63	7	0.80	0.90	1.33	1.05	7	1.70	12	71.96	0.50	1.20	15	0.16	1.00	0.11	0.80	1.30	1.00	0.21	0.98	0.334	0.62	Liquefiable Soil
3	4.00	5.50	4.75	85.50	38.92	7	0.85	0.90	1.33	1.05	7	1.60	12	64.35	0.50	1.20	15	0.16	1.00	0.13	0.80	1.21	1.00	0.19	0.96	0.330	0.58	Liquefiable Soil
4	5.50	7.00	6.25	112.25	50.96	12	0.95	0.90	1.33	1.05	14	1.40	20	25.43	4.33	1.12	27	0.33	1.00	0.25	0.80	1.14	1.00	0.38	0.95	0.327	1.16	Liquefiable Soil
5	7.00	8.50	7.75	138.88	62.87	14	0.95	0.90	1.33	1.05	17	1.26	21	25.43	4.33	1.12	28	0.37	1.00	0.28	0.80	1.10	1.00	0.40	0.94	0.324	1.24	Non Liquefiable Soil
6	8.50	10.00	9.25	165.50	74.79	17	0.95	0.90	1.33	1.05	20	1.16	23	16.79	2.96	1.06	28	0.36	1.00	0.34	0.80	1.06	1.00	0.38	0.93	0.321	1.20	Liquefiable Soil
7	10.00	11.50	10.75	192.13	86.70	25	1.00	0.90	1.33	1.05	31	1.07	34	18.40	3.32	1.07	39	NL	1.00	0.51	0.74	1.04	1.00	NL	0.89	0.307	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.75	98.62	31	1.00	0.90	1.33	1.05	39	1.01	39	29.62	4.68	1.15	50	NL	1.00	0.63	0.68	1.00	1.00	NL	0.85	0.293	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.40	112.56	43	1.00	0.90	1.33	1.05	54	0.94	51	19.80	3.58	1.08	58	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.277	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	276.05	126.50	46	1.00	0.90	1.33	1.05	58	0.89	51	5.28	0.01	1.00	52	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.261	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	305.38	141.11	56	1.00	0.90	1.33	1.05	70	0.84	59	20.95	3.77	1.09	68	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.245	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	335.38	156.40	60	1.00	0.90	1.33	1.05	75	0.80	60	21.18	3.81	1.09	69	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.230	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	365.38	171.69	72	1.00	0.90	1.33	1.05	90	0.76	69	27.27	4.50	1.13	83	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.215	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	395.38	186.98	76	1.00	0.90	1.33	1.05	96	0.73	70	25.38	4.33	1.12	82	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	425.38	202.27	88	1.00	0.90	1.33	1.05	111	0.70	78	19.44	3.52	1.08	87	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.186	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	455.38	217.56	100	1.00	0.90	1.33	1.05	126	0.68	85	19.80	3.58	1.08	95	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.172	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	485.38	232.85	100	1.00	0.90	1.33	1.05	126	0.66	82	29.30	4.66	1.15	99	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	515.38	248.14	100	1.00	0.90	1.33	1.05	126	0.63	80	13.25	1.97	1.04	85	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.145	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	550.38	265.98	100	1.00	0.90	1.33	1.05	126	0.61	77	18.25	3.29	1.07	86	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	570.38	276.18	100	1.00	0.90	1.33	1.05	126	0.60	76	17.34	3.09	1.06	83	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-15
Chainage	2+035

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Brownish, fine-grained inorganic silt of low Plastici	0.00	5.25	16.80	6.99
2	Medium Dense, Gray Brownish fine-grained silty sand (SM)	5.25	10.00	17.75	7.94
3	Dense, Dark Greyish to Brownish Gray, fine-grained silty sand (SM)	10.00	17.25	19.10	9.29
4	Very Dense, Brownish to Dark Greyish, fine-grained silty sand (SM)	17.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.00	8.74	7	0.75	0.90	1.33	1.05	7	1.70	11	65.22	0.50	1.20	14	0.15	1.00	0.10	0.80	1.63	1.00	0.24	0.99	0.371	0.66	Liquefiable Soil
2	2.50	4.00	3.25	54.60	22.73	12	0.80	0.90	1.33	1.05	12	1.70	21	51.18	0.50	1.20	25	0.29	1.00	0.21	0.80	1.34	1.00	0.40	0.98	0.365	1.08	Liquefiable Soil
3	4.00	5.50	4.75	79.80	33.22	14	0.85	0.90	1.33	1.05	15	1.70	25	72.72	0.50	1.20	31	NL	1.00	0.26	0.80	1.25	1.00	NL	0.96	0.361	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	105.95	44.66	20	0.95	0.90	1.33	1.05	24	1.50	36	26.78	4.46	1.13	45	NL	1.00	0.40	0.80	1.17	1.00	NL	0.95	0.352	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.58	56.57	25	0.95	0.90	1.33	1.05	30	1.33	40	26.78	4.46	1.13	49	NL	1.00	0.49	0.76	1.15	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.20	68.49	28	0.95	0.90	1.33	1.05	33	1.21	40	16.89	2.99	1.06	46	NL	1.00	0.55	0.73	1.11	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.84	81.42	34	1.00	0.90	1.33	1.05	43	1.11	47	21.43	3.84	1.09	55	NL	1.00	0.85	0.60	1.09	1.00	NL	0.89	0.318	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.49	95.36	37	1.00	0.90	1.33	1.05	47	1.02	48	21.43	3.84	1.09	56	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.299	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.14	109.30	40	1.00	0.90	1.33	1.05	50	0.96	48	28.90	4.63	1.15	60	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.281	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	272.79	123.24	43	1.00	0.90	1.33	1.05	54	0.90	49	25.14	4.30	1.12	59	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.265	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	301.44	137.18	38	1.00	0.90	1.33	1.05	48	0.85	41	23.62	4.13	1.10	49	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.249	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.99	152.02	51	1.00	0.90	1.33	1.05	64	0.81	52	32.99	4.88	1.18	66	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.99	167.31	54	1.00	0.90	1.33	1.05	68	0.77	52	26.43	4.43	1.13	64	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.99	182.60	57	1.00	0.90	1.33	1.05	72	0.74	53	27.59	4.53	1.13	65	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.99	197.89	67	1.00	0.90	1.33	1.05	84	0.71	60	27.62	4.53	1.14	72	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	450.99	213.18	77	1.00	0.90	1.33	1.05	97	0.68	66	23.24	4.09	1.10	77	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.99	228.47	88	1.00	0.90	1.33	1.05	111	0.66	73	25.90	4.38	1.12	86	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	510.99	243.76	100	1.00	0.90	1.33	1.05	126	0.64	81	18.83	3.40	1.07	90	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	545.99	261.59	100	1.00	0.90	1.33	1.05	126	0.62	78	21.60	3.87	1.09	89	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	565.99	271.79	100	1.00	0.90	1.33	1.05	126	0.61	76	19.13	3.46	1.07	85	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-16
Chainage	2+135

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish fine-grained silty sand (SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Brownish Gray, fine-grained silty sand and Gravel (SM)	4.00	11.25	17.75	7.94
3	Dense to Very Dense, Brownish to Yellowish fine-grained silty sand and	11.25	21.25	19.50	9.69
4	Hard, Yellowish to Brownish, fine-grained inorganic silt of low Plasticity	21.25	26.25	18.90	9.09
5	Very Dense, Brownish fine-grained silty sand (SM)	26.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	27.83	4.55	1.14	15	0.16	1.00	0.06	0.80	1.64	1.00	0.27	0.99	0.381	0.71	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	7	0.80	0.90	1.33	1.05	7	1.70	12	29.51	4.67	1.15	18	0.20	1.00	0.11	0.80	1.36	1.00	0.27	0.98	0.375	0.71	Liquefiable Soil
3	4.00	5.50	4.75	79.31	32.73	11	0.85	0.90	1.33	1.05	12	1.70	20	23.77	4.15	1.11	26	0.32	1.00	0.21	0.80	1.25	1.00	0.40	0.96	0.364	1.09	Liquefiable Soil
4	5.50	7.00	6.25	105.94	44.65	12	0.95	0.90	1.33	1.05	14	1.50	21	20.11	3.63	1.08	27	0.33	1.00	0.25	0.80	1.18	1.00	0.39	0.95	0.352	1.11	Liquefiable Soil
5	7.00	8.50	7.75	132.56	56.56	17	0.95	0.90	1.33	1.05	20	1.33	27	19.62	3.55	1.08	33	NL	1.00	0.34	0.80	1.12	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.19	68.48	24	0.95	0.90	1.33	1.05	29	1.21	35	19.60	3.54	1.08	41	NL	1.00	0.47	0.76	1.09	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.81	80.39	30	1.00	0.90	1.33	1.05	38	1.12	42	26.67	4.45	1.13	52	NL	1.00	0.61	0.69	1.07	1.00	NL	0.89	0.320	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	214.19	94.06	33	1.00	0.90	1.33	1.05	41	1.03	43	25.92	4.38	1.12	52	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.301	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	243.44	108.60	42	1.00	0.90	1.33	1.05	53	0.96	51	19.50	3.53	1.08	58	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.282	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	272.69	123.14	53	1.00	0.90	1.33	1.05	67	0.90	60	24.30	4.21	1.11	71	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.265	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	301.94	137.68	58	1.00	0.90	1.33	1.05	73	0.85	62	21.80	3.90	1.09	72	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.249	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	331.19	152.22	44	1.00	0.90	1.33	1.05	55	0.81	45	21.80	3.90	1.09	53	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.44	166.76	47	1.00	0.90	1.33	1.05	59	0.77	46	26.09	4.40	1.12	56	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.69	181.30	56	1.00	0.90	1.33	1.05	70	0.74	52	27.04	4.48	1.13	64	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	418.04	194.94	73	1.00	0.90	1.33	1.05	92	0.72	66	76.30	0.50	1.20	79	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.190	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	446.39	208.58	100	1.00	0.90	1.33	1.05	126	0.69	87	63.00	0.50	1.20	105	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.176	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	474.74	222.22	100	1.00	0.90	1.33	1.05	126	0.67	84	78.26	0.50	1.20	102	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.19	236.96	100	1.00	0.90	1.33	1.05	126	0.65	82	25.18	4.31	1.12	95	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	539.19	254.79	100	1.00	0.90	1.33	1.05	126	0.63	79	18.19	3.27	1.07	87	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	559.19	264.99	100	1.00	0.90	1.33	1.05	126	0.61	77	34.09	4.94	1.19	97	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-17
Chainage	2+230

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish fine-grained silty sand (SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Greyish fine-grained silty sand (SM)	4.00	9.25	17.75	7.94
3	Dense, Gray Brownish fine-grained silty sand (SM)	9.25	15.25	19.10	9.29
4	Very Dense, Brownish Gray, fine-grained silty sand (SM)	15.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	20.73	3.74	1.08	14	0.15	1.00	0.06	0.80	1.64	1.00	0.25	0.99	0.381	0.65	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	9	0.80	0.90	1.33	1.05	9	1.70	15	17.16	3.05	1.06	19	0.21	1.00	0.17	0.80	1.36	1.00	0.28	0.98	0.375	0.75	Liquefiable Soil
3	4.00	5.50	4.75	79.31	32.73	16	0.85	0.90	1.33	1.05	17	1.70	29	26.66	4.45	1.13	37	NL	1.00	0.29	0.80	1.25	1.00	NL	0.96	0.364	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	105.94	44.65	21	0.95	0.90	1.33	1.05	25	1.50	38	12.61	1.76	1.03	41	NL	1.00	0.41	0.79	1.18	1.00	NL	0.95	0.352	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.56	56.56	27	0.95	0.90	1.33	1.05	32	1.33	43	29.77	4.69	1.15	54	NL	1.00	0.53	0.74	1.16	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.19	68.48	34	0.95	0.90	1.33	1.05	41	1.21	49	44.78	0.50	1.20	59	NL	1.00	0.85	0.60	1.16	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.84	82.42	37	1.00	0.90	1.33	1.05	47	1.10	51	25.00	4.29	1.12	61	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.315	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	216.49	96.36	40	1.00	0.90	1.33	1.05	50	1.02	51	25.00	4.29	1.12	61	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.297	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	245.14	110.30	42	1.00	0.90	1.33	1.05	53	0.95	50	22.03	3.93	1.09	59	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.280	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	273.79	124.24	52	1.00	0.90	1.33	1.05	65	0.90	59	22.03	3.93	1.09	68	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.264	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	303.79	139.53	53	1.00	0.90	1.33	1.05	67	0.85	56	19.30	3.49	1.07	64	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.247	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	333.79	154.82	63	1.00	0.90	1.33	1.05	79	0.80	64	23.86	4.16	1.11	75	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.231	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	363.79	170.11	67	1.00	0.90	1.33	1.05	84	0.77	65	17.75	3.18	1.06	72	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.216	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	393.79	185.40	74	1.00	0.90	1.33	1.05	93	0.73	68	23.90	4.17	1.11	80	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.201	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	423.79	200.69	82	1.00	0.90	1.33	1.05	103	0.71	73	22.31	3.97	1.10	84	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.187	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	453.79	215.98	86	1.00	0.90	1.33	1.05	108	0.68	74	25.92	4.38	1.12	87	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	483.79	231.27	100	1.00	0.90	1.33	1.05	126	0.66	83	23.98	4.18	1.11	96	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.159	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	513.79	246.56	100	1.00	0.90	1.33	1.05	126	0.64	80	22.48	3.99	1.10	92	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.145	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	548.79	264.39	100	1.00	0.90	1.33	1.05	126	0.61	77	22.00	3.93	1.09	88	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	568.79	274.59	100	1.00	0.90	1.33	1.05	126	0.60	76	19.20	3.47	1.07	85	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-18
Chainage	2+567

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff, Brownish Gray, fine-grained inorganic silt of low Plasticity	0.00	4.00	16.40	6.59
2	Medium Dense, Greyish fine-grained silty sand (SM)	4.00	15.25	17.75	7.94
3	Hard, Little Brownish to Brownish, fine-grained inorganic silt of low Plas	15.25	28.00	18.90	9.09
4	Very Dense, Yellowish fine-grained silty sand (SM)	28.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mv}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.50	8.24	6	0.75	0.90	1.33	1.05	6	1.70	10	31.96	4.83	1.17	16	0.17	1.00	0.06	0.80	1.65	1.00	0.28	0.99	0.384	0.73	Liquefiable Soil
2	2.50	4.00	3.25	53.30	21.43	9	0.80	0.90	1.33	1.05	9	1.70	15	31.96	4.83	1.17	23	0.25	1.00	0.17	0.80	1.36	1.00	0.35	0.98	0.378	0.91	Liquefiable Soil
3	4.00	5.50	4.75	78.91	32.33	13	0.85	0.90	1.33	1.05	14	1.70	24	26.60	4.44	1.13	31	NL	1.00	0.24	0.80	1.25	1.00	NL	0.96	0.367	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	105.54	44.25	17	0.95	0.90	1.33	1.05	20	1.50	31	21.95	3.92	1.09	37	NL	1.00	0.34	0.80	1.18	1.00	NL	0.95	0.354	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.16	56.16	22	0.95	0.90	1.33	1.05	26	1.33	35	21.95	3.92	1.09	42	NL	1.00	0.43	0.78	1.13	1.00	NL	0.94	0.345	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.79	68.08	26	0.95	0.90	1.33	1.05	31	1.21	38	17.91	3.21	1.07	43	NL	1.00	0.51	0.75	1.10	1.00	NL	0.93	0.338	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.41	79.99	30	1.00	0.90	1.33	1.05	38	1.12	42	31.74	4.81	1.17	54	NL	1.00	0.61	0.69	1.07	1.00	NL	0.89	0.321	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.04	91.91	24	1.00	0.90	1.33	1.05	30	1.04	31	17.83	3.20	1.07	37	NL	1.00	0.49	0.75	1.02	1.00	NL	0.85	0.305	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	238.66	103.82	28	1.00	0.90	1.33	1.05	35	0.98	35	29.02	4.64	1.15	44	NL	1.00	0.57	0.71	0.99	1.00	NL	0.81	0.289	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	265.29	115.74	26	1.00	0.90	1.33	1.05	33	0.93	30	24.03	4.18	1.11	38	NL	1.00	0.53	0.73	0.96	1.00	NL	0.77	0.274	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	293.64	129.38	31	1.00	0.90	1.33	1.05	39	0.88	34	17.09	3.03	1.06	39	NL	1.00	0.63	0.68	0.92	1.00	NL	0.73	0.257	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	321.99	143.02	34	1.00	0.90	1.33	1.05	43	0.84	36	76.37	0.50	1.20	43	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.241	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	350.34	156.66	38	1.00	0.90	1.33	1.05	48	0.80	38	67.00	0.50	1.20	46	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.226	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	378.69	170.30	34	1.00	0.90	1.33	1.05	43	0.77	33	22.71	4.02	1.10	40	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.210	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	407.04	183.94	41	1.00	0.90	1.33	1.05	52	0.74	38	19.83	3.59	1.08	45	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.196	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	435.39	197.58	45	1.00	0.90	1.33	1.05	57	0.71	40	25.28	4.32	1.12	49	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.181	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	463.74	211.22	49	1.00	0.90	1.33	1.05	62	0.69	42	22.88	4.04	1.10	51	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.167	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	492.09	224.86	51	1.00	0.90	1.33	1.05	64	0.67	43	18.47	3.33	1.07	49	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.152	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	526.26	241.87	63	1.00	0.90	1.33	1.05	79	0.64	51	28.22	4.58	1.14	63	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.136	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	546.26	252.06	71	1.00	0.90	1.33	1.05	89	0.63	56	19.90	3.60	1.08	64	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.126	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-18A
Chainage	2+279

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish fine-grained silty sand and Gravel(SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Brownish fine-grained silty sand and Gravel (SM)	4.00	10.00	17.75	7.94
3	Dense to Very Dense, Brownish Gray, fine-grained silty sand (SM)	10.00	17.25	19.50	9.69
4	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand a	17.25	20.25	18.90	9.09
5	Very Dense, Yellowish to Brownish, fine-grained silty sand (SM)	20.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	31.96	4.83	1.17	16	0.17	1.00	0.06	0.80	1.64	1.00	0.28	0.99	0.381	0.74	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	9	0.80	0.90	1.33	1.05	9	1.70	15	24.76	4.26	1.11	21	0.23	1.00	0.17	0.80	1.36	1.00	0.32	0.98	0.375	0.84	Liquefiable Soil
3	4.00	5.50	4.75	79.31	32.73	11	0.85	0.90	1.33	1.05	12	1.70	20	26.60	4.44	1.13	27	0.34	1.00	0.21	0.80	1.25	1.00	0.42	0.96	0.364	1.16	Liquefiable Soil
4	5.50	7.00	6.25	105.94	44.65	16	0.95	0.90	1.33	1.05	19	1.50	29	26.60	4.44	1.13	37	NL	1.00	0.32	0.80	1.18	1.00	NL	0.95	0.352	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.56	56.56	23	0.95	0.90	1.33	1.05	27	1.33	37	21.95	3.92	1.09	44	NL	1.00	0.45	0.77	1.14	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.19	68.48	25	0.95	0.90	1.33	1.05	30	1.21	36	17.91	3.21	1.07	42	NL	1.00	0.49	0.76	1.10	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.13	81.70	32	1.00	0.90	1.33	1.05	40	1.11	44	31.74	4.81	1.17	57	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.317	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	216.38	96.24	37	1.00	0.90	1.33	1.05	47	1.02	47	17.83	3.20	1.07	54	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.297	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	245.63	110.78	44	1.00	0.90	1.33	1.05	55	0.95	53	29.02	4.64	1.15	65	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.279	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	274.88	125.32	51	1.00	0.90	1.33	1.05	64	0.89	57	24.03	4.18	1.11	68	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.262	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	304.13	139.86	65	1.00	0.90	1.33	1.05	82	0.85	69	17.09	3.03	1.06	76	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.247	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	332.78	153.80	53	1.00	0.90	1.33	1.05	67	0.81	54	67.00	0.50	1.20	65	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.232	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	361.13	167.44	61	1.00	0.90	1.33	1.05	77	0.77	59	67.00	0.50	1.20	72	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.58	182.18	72	1.00	0.90	1.33	1.05	90	0.74	67	22.71	4.02	1.10	78	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.58	197.47	82	1.00	0.90	1.33	1.05	103	0.71	73	19.83	3.59	1.08	83	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	450.58	212.76	100	1.00	0.90	1.33	1.05	126	0.69	86	25.28	4.32	1.12	101	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.58	228.05	100	1.00	0.90	1.33	1.05	126	0.66	83	22.88	4.04	1.10	96	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	510.58	243.34	100	1.00	0.90	1.33	1.05	126	0.64	81	18.47	3.33	1.07	89	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	545.58	261.18	100	1.00	0.90	1.33	1.05	126	0.62	78	28.22	4.58	1.14	93	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	565.58	271.38	100	1.00	0.90	1.33	1.05	126	0.61	76	19.90	3.60	1.08	86	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-19
Chainage	2+591

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish to Yellowish, fine-grained silty sand and Gravel(SM)	0.00	6.25	16.50	6.69
2	Medium Dense, Brownish to Greyish, fine-grained silty sand and Gravel(S	6.25	11.25	17.75	7.94
3	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with san	11.25	17.25	18.00	8.19
4	Hard, Dark Brownish to Brownish, fine-grained inorganic silt of low Plas	17.25	22.00	18.90	9.09
5	Very Dense, Brownish to Greyish, fine-grained silty sand and Gravel(SM)	22.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	8	0.75	0.90	1.33	1.05	8	1.70	13	19.32	3.49	1.07	17	0.18	1.00	0.13	0.80	1.64	1.00	0.30	0.99	0.381	0.79	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	8	0.80	0.90	1.33	1.05	8	1.70	14	19.32	3.49	1.07	18	0.19	1.00	0.15	0.80	1.36	1.00	0.26	0.98	0.375	0.70	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	10	0.85	0.90	1.33	1.05	11	1.70	18	31.62	4.81	1.17	26	0.31	1.00	0.19	0.80	1.26	1.00	0.39	0.96	0.371	1.06	Liquefiable Soil
4	5.50	7.00	6.25	103.13	41.83	15	0.95	0.90	1.33	1.05	18	1.55	28	31.62	4.81	1.17	37	NL	1.00	0.30	0.80	1.19	1.00	NL	0.95	0.366	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	129.75	53.75	20	0.95	0.90	1.33	1.05	24	1.36	33	30.17	4.72	1.16	42	NL	1.00	0.40	0.80	1.13	1.00	NL	0.94	0.354	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	156.38	65.66	20	0.95	0.90	1.33	1.05	24	1.23	29	22.85	4.04	1.10	36	NL	1.00	0.40	0.80	1.09	1.00	NL	0.93	0.345	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	183.00	77.58	23	1.00	0.90	1.33	1.05	29	1.14	33	24.14	4.20	1.11	41	NL	1.00	0.47	0.76	1.06	1.00	NL	0.89	0.326	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	209.88	89.74	22	1.00	0.90	1.33	1.05	28	1.06	29	65.14	0.50	1.20	36	NL	1.00	0.46	0.77	1.02	1.00	NL	0.85	0.309	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	236.88	102.03	25	1.00	0.90	1.33	1.05	31	0.99	31	63.80	0.50	1.20	38	NL	1.00	0.51	0.74	0.99	1.00	NL	0.81	0.292	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	263.88	114.32	30	1.00	0.90	1.33	1.05	38	0.94	35	77.08	0.50	1.20	43	NL	1.00	0.61	0.69	0.96	1.00	NL	0.77	0.276	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	290.88	126.61	26	1.00	0.90	1.33	1.05	33	0.89	29	77.28	0.50	1.20	35	NL	1.00	0.53	0.73	0.94	1.00	NL	0.73	0.260	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	318.78	139.80	45	1.00	0.90	1.33	1.05	57	0.85	48	65.70	0.50	1.20	58	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.244	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	347.13	153.44	40	1.00	0.90	1.33	1.05	50	0.81	41	70.68	0.50	1.20	49	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.228	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	375.48	167.08	38	1.00	0.90	1.33	1.05	48	0.77	37	74.23	0.50	1.20	45	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.213	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	404.65	181.55	45	1.00	0.90	1.33	1.05	57	0.74	42	24.80	4.27	1.11	51	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.197	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	434.65	196.84	48	1.00	0.90	1.33	1.05	60	0.71	43	20.55	3.71	1.08	50	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.181	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	464.65	212.13	55	1.00	0.90	1.33	1.05	69	0.69	47	25.43	4.33	1.12	57	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.166	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	494.65	227.42	59	1.00	0.90	1.33	1.05	74	0.66	49	23.42	4.11	1.10	58	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.151	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	529.65	245.26	62	1.00	0.90	1.33	1.05	78	0.64	50	19.10	3.45	1.07	57	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.135	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	549.65	255.45	66	1.00	0.90	1.33	1.05	83	0.63	52	25.19	4.31	1.12	62	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.125	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-19A
Chainage	2+420

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Greyish, fine-grained silty sand and Gravel(SM)	0.00	7.00	17.00	7.19
2	Dense, Greyish to Brownish, fine-grained silty sand (SM)	7.00	16.00	19.10	9.29
3	Very Dense, Brownish Grey, fine-grained silty sand (SM)	16.00	22.00	20.00	10.19
4	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand (N	22.00	26.25	18.90	9.09
5	Very Dense, Greyish, fine-grained silty sand (SM)	26.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	8	0.75	0.90	1.33	1.05	8	1.70	13	24.02	4.18	1.11	18	0.20	1.00	0.13	0.80	1.62	1.00	0.32	0.99	0.365	0.87	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	12	0.80	0.90	1.33	1.05	12	1.70	21	24.02	4.18	1.11	27	0.34	1.00	0.21	0.80	1.34	1.00	0.45	0.98	0.360	1.25	Non Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	21	0.85	0.90	1.33	1.05	22	1.70	38	20.51	3.70	1.08	45	NL	1.00	0.37	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	26	0.95	0.90	1.33	1.05	31	1.49	46	20.51	3.70	1.08	54	NL	1.00	0.51	0.75	1.23	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.33	57.32	31	0.95	0.90	1.33	1.05	37	1.32	49	26.00	4.39	1.12	59	NL	1.00	0.60	0.70	1.18	1.00	NL	0.94	0.341	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	161.98	71.26	34	0.95	0.90	1.33	1.05	41	1.18	48	24.21	4.20	1.11	58	NL	1.00	0.85	0.60	1.15	1.00	NL	0.93	0.329	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	190.63	85.20	37	1.00	0.90	1.33	1.05	47	1.08	50	24.76	4.26	1.11	60	NL	1.00	0.85	0.60	1.07	1.00	NL	0.89	0.310	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	219.28	99.14	39	1.00	0.90	1.33	1.05	49	1.00	49	23.94	4.17	1.11	59	NL	1.00	0.85	0.60	1.00	1.00	NL	0.85	0.292	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.93	113.08	43	1.00	0.90	1.33	1.05	54	0.94	51	21.06	3.79	1.09	59	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.276	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	276.58	127.02	46	1.00	0.90	1.33	1.05	58	0.89	51	25.77	4.37	1.12	62	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.260	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	305.90	141.64	52	1.00	0.90	1.33	1.05	65	0.84	55	26.89	4.47	1.13	66	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.245	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	335.90	156.93	60	1.00	0.90	1.33	1.05	75	0.80	60	19.40	3.51	1.08	68	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.229	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	365.90	172.22	68	1.00	0.90	1.33	1.05	85	0.76	65	26.27	4.41	1.12	78	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.214	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	395.90	187.51	73	1.00	0.90	1.33	1.05	92	0.73	67	20.43	3.69	1.08	76	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	425.08	201.97	77	1.00	0.90	1.33	1.05	97	0.70	68	67.30	0.50	1.20	82	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.186	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	453.43	215.61	84	1.00	0.90	1.33	1.05	106	0.68	72	22.26	3.96	1.10	83	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	481.78	229.25	90	1.00	0.90	1.33	1.05	113	0.66	75	72.72	0.50	1.20	90	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.159	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	511.23	243.99	100	1.00	0.90	1.33	1.05	126	0.64	80	18.73	3.38	1.07	90	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	546.23	261.83	100	1.00	0.90	1.33	1.05	126	0.62	78	27.21	4.50	1.13	92	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	566.23	272.03	100	1.00	0.90	1.33	1.05	126	0.61	76	20.71	3.73	1.08	86	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-20
Chainage	2+541

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Whiteish, fine-grained silty sand (SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Brownish, fine-grained silty sand (SM)	4.00	11.25	17.75	7.94
3	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with san	11.25	14.25	18.00	8.19
4	Medium Dense, Gray Brownish, fine-grained silty sand (SM)	14.25	17.25	17.75	7.94
5	Hard, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity	17.25	23.25	18.90	9.09
6	Very Dense, Brownish, fine-grained silty sand (SM)	23.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	9	0.75	0.90	1.33	1.05	8	1.70	14	24.80	4.27	1.11	20	0.22	1.00	0.16	0.80	1.64	1.00	0.36	0.99	0.381	0.95	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	9	0.80	0.90	1.33	1.05	9	1.70	15	17.38	3.10	1.06	19	0.21	1.00	0.17	0.80	1.36	1.00	0.28	0.98	0.375	0.75	Liquefiable Soil
3	4.00	5.50	4.75	79.31	32.73	12	0.85	0.90	1.33	1.05	13	1.70	22	21.60	3.87	1.09	28	0.36	1.00	0.22	0.80	1.25	1.00	0.45	0.96	0.364	1.23	Non Liquefiable Soil
4	5.50	7.00	6.25	105.94	44.65	14	0.95	0.90	1.33	1.05	17	1.50	25	23.01	4.06	1.10	32	NL	1.00	0.28	0.80	1.18	1.00	NL	0.95	0.352	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.56	56.56	18	0.95	0.90	1.33	1.05	21	1.33	29	23.01	4.06	1.10	36	NL	1.00	0.36	0.80	1.12	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.19	68.48	23	0.95	0.90	1.33	1.05	27	1.21	33	23.14	4.08	1.10	41	NL	1.00	0.45	0.77	1.09	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.81	80.39	26	1.00	0.90	1.33	1.05	33	1.12	36	22.48	3.99	1.10	44	NL	1.00	0.53	0.73	1.06	1.00	NL	0.89	0.320	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.69	92.56	26	1.00	0.90	1.33	1.05	33	1.04	34	74.34	0.50	1.20	41	NL	1.00	0.53	0.73	1.02	1.00	NL	0.85	0.304	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	239.69	104.85	31	1.00	0.90	1.33	1.05	39	0.98	38	75.93	0.50	1.20	46	NL	1.00	0.63	0.68	0.99	1.00	NL	0.81	0.288	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	266.44	116.89	22	1.00	0.90	1.33	1.05	28	0.92	26	17.25	3.07	1.06	30	NL	1.00	0.46	0.77	0.97	1.00	NL	0.77	0.273	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	293.06	128.80	26	1.00	0.90	1.33	1.05	33	0.88	29	17.25	3.07	1.06	34	NL	1.00	0.53	0.73	0.93	1.00	NL	0.73	0.258	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	320.84	141.87	37	1.00	0.90	1.33	1.05	47	0.84	39	70.09	0.50	1.20	47	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.242	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	349.19	155.51	34	1.00	0.90	1.33	1.05	43	0.80	34	71.71	0.50	1.20	42	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.227	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	377.54	169.15	38	1.00	0.90	1.33	1.05	48	0.77	37	69.00	0.50	1.20	45	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.211	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	405.89	182.79	42	1.00	0.90	1.33	1.05	53	0.74	39	69.40	0.50	1.20	47	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.196	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	434.24	196.43	44	1.00	0.90	1.33	1.05	55	0.71	39	21.62	3.87	1.09	47	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.182	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	462.59	210.07	48	1.00	0.90	1.33	1.05	60	0.69	42	28.46	4.60	1.14	52	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.167	NL	Non Liquefiable Soil
18	26.50	27.50	27.00	486.21	221.43	51	1.00	0.90	1.33	1.05	64	0.67	43	24.29	4.21	1.11	52	NL	1.00	0.85	0.60	0.73	8.00	NL	0.45	0.155	NL	Non Liquefiable Soil
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-20A
Chainage	2+514

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Yellowish to Whiteish, fine-grained inorganic silt of	0.00	5.25	16.80	6.99
2	Medium Dense, Brownish, fine-grained silty sand and Gravel (SM)	5.25	10.00	17.75	7.94
3	Dense, Brownish Grey, fine-grained silty sand (SM)	10.00	13.00	19.10	9.29
4	Very Dense, Brownish, fine-grained silty sand (SM)	13.00	17.25	20.00	10.19
5	Very Stiff to Hard, Yellowish, fine-grained inorganic silt of low Plasticity	17.25	20.25	18.00	8.19
6	Very Dense, Brownish, fine-grained silty sand and Gravel (SM)	20.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.00	8.74	6	0.75	0.90	1.33	1.05	6	1.70	10	66.40	0.50	1.20	12	0.13	1.00	0.06	0.80	1.63	1.00	0.21	0.99	0.371	0.58	Liquefiable Soil
2	2.50	4.00	3.25	54.60	22.73	7	0.80	0.90	1.33	1.05	7	1.70	12	47.40	0.50	1.20	15	0.16	1.00	0.11	0.80	1.34	1.00	0.21	0.98	0.365	0.58	Liquefiable Soil
3	4.00	5.50	4.75	79.80	33.22	9	0.85	0.90	1.33	1.05	10	1.70	16	73.28	0.50	1.20	20	0.22	1.00	0.17	0.80	1.25	1.00	0.27	0.96	0.361	0.75	Liquefiable Soil
4	5.50	7.00	6.25	105.95	44.66	13	0.95	0.90	1.33	1.05	16	1.50	23	30.77	4.76	1.16	32	NL	1.00	0.27	0.80	1.17	1.00	NL	0.95	0.352	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.58	56.57	16	0.95	0.90	1.33	1.05	19	1.33	25	30.77	4.76	1.16	34	NL	1.00	0.32	0.80	1.12	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.20	68.49	27	0.95	0.90	1.33	1.05	32	1.21	39	43.57	0.50	1.20	47	NL	1.00	0.53	0.74	1.10	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.84	81.42	34	1.00	0.90	1.33	1.05	43	1.11	47	18.32	3.30	1.07	54	NL	1.00	0.85	0.60	1.09	1.00	NL	0.89	0.318	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.49	95.36	42	1.00	0.90	1.33	1.05	53	1.02	54	18.32	3.30	1.07	61	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.299	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.81	109.97	51	1.00	0.90	1.33	1.05	64	0.95	61	22.88	4.04	1.10	71	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.280	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	274.81	125.26	56	1.00	0.90	1.33	1.05	70	0.89	63	27.79	4.54	1.14	76	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.262	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	304.81	140.55	62	1.00	0.90	1.33	1.05	78	0.84	66	21.00	3.78	1.09	75	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.246	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	332.81	153.84	54	1.00	0.90	1.33	1.05	68	0.81	55	22.04	3.93	1.09	64	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.232	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	359.81	166.13	60	1.00	0.90	1.33	1.05	75	0.78	59	69.80	0.50	1.20	71	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	386.81	178.42	79	1.00	0.90	1.33	1.05	99	0.75	74	25.83	4.37	1.12	88	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.205	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	413.81	190.71	100	1.00	0.90	1.33	1.05	126	0.72	91	21.30	3.82	1.09	103	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	440.81	203.00	100	1.00	0.90	1.33	1.05	126	0.70	88	23.94	4.17	1.11	102	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	467.81	215.29	100	1.00	0.90	1.33	1.05	126	0.68	86	22.04	3.93	1.09	98	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.165	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	494.81	227.58	100	1.00	0.90	1.33	1.05	126	0.66	83	23.00	4.06	1.10	96	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.151	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	526.31	241.92	100	1.00	0.90	1.33	1.05	126	0.64	81	24.44	4.23	1.11	94	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.136	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	544.31	250.11	100	1.00	0.90	1.33	1.05	126	0.63	79	22.97	4.05	1.10	91	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.127	NL	Non Liquefiable Soil

B.4. Zone 4: CH: 2+515 km to 3+515 km (BH-21 to BH-30)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-21	0.00	2.50	7	7	11	14	0.24	0.37	0.66	Liquefiable Soil
BH-21	2.50	4.00	9	9	15	19	0.27	0.36	0.75	Liquefiable Soil
BH-21	4.00	5.50	11	12	20	24	0.35	0.35	0.99	Liquefiable Soil
BH-22	0.00	2.50	8	8	13	16	0.27	0.37	0.75	Liquefiable Soil
BH-22	2.50	4.00	9	9	15	21	0.31	0.36	0.87	Liquefiable Soil
BH-22	4.00	5.50	10	11	18	25	0.36	0.35	1.03	Liquefiable Soil
BH-23	0.00	2.50	7	7	11	16	0.27	0.37	0.74	Liquefiable Soil
BH-23	2.50	4.00	9	9	15	17	0.24	0.36	0.66	Liquefiable Soil
BH-23	4.00	5.50	9	10	16	22	0.29	0.36	0.82	Liquefiable Soil
BH-24	0.00	2.50	8	8	13	18	0.31	0.34	0.91	Liquefiable Soil
BH-25	0.00	2.50	7	7	11	14	0.24	0.37	0.66	Liquefiable Soil
BH-25	2.50	4.00	8	8	14	17	0.24	0.36	0.67	Liquefiable Soil
BH-26	0.00	2.50	9	8	14	19	0.33	0.37	0.91	Liquefiable Soil
BH-26	2.50	4.00	10	10	17	22	0.33	0.36	0.91	Liquefiable Soil
BH-26	7.00	8.50	12	14	19	27	0.37	0.34	1.08	Liquefiable Soil
BH-27	0.00	2.50	9	8	14	21	0.38	0.37	1.03	Liquefiable Soil
BH-28	0.00	2.50	6	6	10	14	0.25	0.37	0.67	Liquefiable Soil
BH-28	2.50	4.00	7	7	12	16	0.22	0.36	0.62	Liquefiable Soil
BH-28	4.00	5.50	9	10	16	20	0.27	0.36	0.77	Liquefiable Soil
BH-28	5.50	7.00	11	13	20	26	0.36	0.35	1.02	Liquefiable Soil
BH-28 A	2.50	4.00	12	12	21	25	0.38	0.34	1.14	Liquefiable Soil
BH-29	2.50	4.00	12	12	21	26	0.41	0.34	1.19	Liquefiable Soil
BH-30	2.50	4.00	12	12	21	25	0.38	0.34	1.14	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-21
Chainage	2+605

Density Profile

Sr No.	Layer Discription		from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)		0.00	4.00	16.97	7.16
2	Medium Dense, Grayish to Brownish Gray, fine-grained silty sand (SM)		4.00	13.00	17.55	7.74
3	Dense to Very Dense, Greyish, to Brownish, fine-grained silty sand (SM)		13.00	17.25	19.55	9.74
4	Hard, Reddish Brown to Brownish, fine-grained inorganic silt of low Plas		17.25	26.25	19.22	9.41
5	Very Dense, Brownish, fine-grained silty sand and Gravel (SM)		26.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.21	8.95	7	0.75	0.90	1.33	1.05	7	1.70	11	38.30	0.50	1.20	14	0.15	1.00	0.10	0.80	1.62	1.00	0.24	0.99	0.366	0.66	Liquefiable Soil
2	2.50	4.00	3.25	55.15	23.28	9	0.80	0.90	1.33	1.05	9	1.70	15	38.30	0.50	1.20	19	0.20	1.00	0.17	0.80	1.34	1.00	0.27	0.98	0.360	0.75	Liquefiable Soil
3	4.00	5.50	4.75	81.04	34.46	11	0.85	0.90	1.33	1.05	12	1.70	20	65.47	0.50	1.20	24	0.28	1.00	0.21	0.80	1.24	1.00	0.35	0.96	0.354	0.99	Liquefiable Soil
4	5.50	7.00	6.25	107.37	46.08	13	0.95	0.90	1.33	1.05	16	1.47	23	27.59	4.53	1.13	30	NL	1.00	0.27	0.80	1.17	1.00	NL	0.95	0.346	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.69	57.69	15	0.95	0.90	1.33	1.05	18	1.32	24	19.84	3.59	1.08	29	0.41	1.00	0.30	0.80	1.12	1.00	0.46	0.94	0.340	1.35	Non Liquefiable Soil
6	8.50	10.00	9.25	160.02	69.31	20	0.95	0.90	1.33	1.05	24	1.20	29	19.84	3.59	1.08	35	NL	1.00	0.40	0.80	1.08	1.00	NL	0.93	0.335	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.34	80.92	23	1.00	0.90	1.33	1.05	29	1.11	32	40.72	0.50	1.20	39	NL	1.00	0.47	0.76	1.05	1.00	NL	0.89	0.319	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.67	92.54	28	1.00	0.90	1.33	1.05	35	1.04	37	42.88	0.50	1.20	44	NL	1.00	0.57	0.71	1.02	1.00	NL	0.85	0.304	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	240.49	105.65	33	1.00	0.90	1.33	1.05	41	0.97	40	22.42	3.98	1.10	48	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.287	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.82	120.27	53	1.00	0.90	1.33	1.05	67	0.91	61	33.44	4.90	1.18	77	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	299.14	134.88	57	1.00	0.90	1.33	1.05	72	0.86	62	34.61	4.96	1.19	79	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	328.14	149.17	35	1.00	0.90	1.33	1.05	44	0.82	36	93.94	0.50	1.20	44	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.236	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	356.97	163.29	41	1.00	0.90	1.33	1.05	52	0.78	40	85.42	0.50	1.20	49	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.221	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	385.80	177.41	83	1.00	0.90	1.33	1.05	104	0.75	78	48.00	0.50	1.20	94	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.206	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	414.63	191.53	100	1.00	0.90	1.33	1.05	126	0.72	91	56.31	0.50	1.20	109	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.191	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	443.46	205.65	100	1.00	0.90	1.33	1.05	126	0.70	88	31.64	4.81	1.17	107	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	472.29	219.77	100	1.00	0.90	1.33	1.05	126	0.67	85	84.80	0.50	1.20	102	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	501.90	234.67	100	1.00	0.90	1.33	1.05	126	0.65	82	31.76	4.81	1.17	101	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	536.90	252.50	100	1.00	0.90	1.33	1.05	126	0.63	79	27.93	4.56	1.14	95	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	556.90	262.70	100	1.00	0.90	1.33	1.05	126	0.62	78	37.82	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-22
Chainage	2+719

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Greyish, fine-grained silty sand(SM)	0.00	4.00	16.97	7.16
2	Medium Dense to Dense, Greyish to Brownish, fine-grained silty sand	4.00	14.25	19.12	9.31
3	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticit	14.25	23.25	18.83	9.02
4	Very Dense, Grey Brownish, fine-grained silty sand(SM)	23.25	26.25	20.00	10.19
5	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand	26.25	30.50	19.22	9.41

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.21	8.95	8	0.75	0.90	1.33	1.05	8	1.70	13	48.18	0.50	1.20	16	0.17	1.00	0.13	0.80	1.62	1.00	0.27	0.99	0.366	0.75	Liquefiable Soil
2	2.50	4.00	3.25	55.15	23.28	9	0.80	0.90	1.33	1.05	9	1.70	15	25.00	4.29	1.12	21	0.23	1.00	0.17	0.80	1.34	1.00	0.31	0.98	0.360	0.87	Liquefiable Soil
3	4.00	5.50	4.75	82.22	35.64	10	0.85	0.90	1.33	1.05	11	1.68	18	27.83	4.55	1.14	25	0.29	1.00	0.19	0.80	1.23	1.00	0.36	0.96	0.347	1.03	Liquefiable Soil
4	5.50	7.00	6.25	110.90	49.61	19	0.95	0.90	1.33	1.05	23	1.42	32	27.83	4.55	1.14	41	NL	1.00	0.38	0.80	1.15	1.00	NL	0.95	0.332	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.58	63.58	20	0.95	0.90	1.33	1.05	24	1.25	30	21.15	3.80	1.09	36	NL	1.00	0.40	0.80	1.09	1.00	NL	0.94	0.322	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	168.26	77.55	24	0.95	0.90	1.33	1.05	29	1.14	33	35.71	0.50	1.20	40	NL	1.00	0.47	0.76	1.06	1.00	NL	0.93	0.315	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	196.94	91.52	30	1.00	0.90	1.33	1.05	38	1.05	39	23.30	4.10	1.10	48	NL	1.00	0.61	0.69	1.03	1.00	NL	0.89	0.298	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	225.62	105.49	31	1.00	0.90	1.33	1.05	39	0.97	38	30.97	4.77	1.16	49	NL	1.00	0.63	0.68	0.98	1.00	NL	0.85	0.283	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	254.30	119.46	36	1.00	0.90	1.33	1.05	45	0.91	41	29.50	4.67	1.15	52	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.268	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	282.69	133.14	26	1.00	0.90	1.33	1.05	33	0.87	28	90.34	0.50	1.20	34	NL	1.00	0.53	0.73	0.93	1.00	NL	0.77	0.254	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	310.94	146.67	34	1.00	0.90	1.33	1.05	43	0.83	35	73.15	0.50	1.20	43	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.240	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	339.18	160.21	38	1.00	0.90	1.33	1.05	48	0.79	38	73.15	0.50	1.20	46	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.227	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	367.43	173.74	45	1.00	0.90	1.33	1.05	57	0.76	43	76.15	0.50	1.20	52	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.213	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	395.67	187.28	54	1.00	0.90	1.33	1.05	68	0.73	50	70.20	0.50	1.20	60	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	423.92	200.81	58	1.00	0.90	1.33	1.05	73	0.71	51	72.90	0.50	1.20	62	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.187	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	453.33	215.52	83	1.00	0.90	1.33	1.05	104	0.68	71	37.48	0.50	1.20	86	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	483.33	230.81	89	1.00	0.90	1.33	1.05	112	0.66	74	30.00	4.71	1.15	90	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.159	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	512.55	245.32	100	1.00	0.90	1.33	1.05	126	0.64	80	53.54	0.50	1.20	97	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	546.19	261.79	100	1.00	0.90	1.33	1.05	126	0.62	78	70.29	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	565.41	271.21	100	1.00	0.90	1.33	1.05	126	0.61	76	34.04	4.93	1.19	96	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-23
Chainage	2+823

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Greyish, fine-grained silty sand(SM)	0.00	6.25	16.97	7.16
2	Medium Dense to Dense, Greyish to Brownish Gray, fine-grained silty	6.25	14.25	19.12	9.31
3	Very Stiff to Hard, Yellowish to Brownish, fine-grained inorganic silt o	14.25	23.25	18.83	9.02
4	Medium Dense to Dense, Brownish, fine-grained silty sand and Grave	23.25	26.25	19.12	9.31
5	Very Stiff to Hard, Brownish Gray, fine-grained inorganic silt of low Pl	26.25	30.50	18.83	9.02

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.21	8.95	7	0.75	0.90	1.33	1.05	7	1.70	11	19.60	3.54	1.08	16	0.17	1.00	0.10	0.80	1.62	1.00	0.27	0.99	0.366	0.74	Liquefiable Soil
2	2.50	4.00	3.25	55.15	23.28	9	0.80	0.90	1.33	1.05	9	1.70	15	10.54	1.05	1.02	17	0.18	1.00	0.17	0.80	1.34	1.00	0.24	0.98	0.360	0.66	Liquefiable Soil
3	4.00	5.50	4.75	80.61	34.03	9	0.85	0.90	1.33	1.05	10	1.70	16	21.01	3.78	1.09	22	0.24	1.00	0.17	0.80	1.24	1.00	0.29	0.96	0.356	0.82	Liquefiable Soil
4	5.50	7.00	6.25	106.06	44.77	16	0.95	0.90	1.33	1.05	19	1.49	29	23.10	4.07	1.10	36	NL	1.00	0.32	0.80	1.17	1.00	NL	0.95	0.352	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	134.74	58.74	18	0.95	0.90	1.33	1.05	21	1.30	28	24.60	4.25	1.11	35	NL	1.00	0.36	0.80	1.11	1.00	NL	0.94	0.337	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	163.42	72.71	26	0.95	0.90	1.33	1.05	31	1.17	36	24.60	4.25	1.11	45	NL	1.00	0.51	0.75	1.08	1.00	NL	0.93	0.326	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	192.10	86.68	28	1.00	0.90	1.33	1.05	35	1.07	38	31.62	4.81	1.17	49	NL	1.00	0.57	0.71	1.04	1.00	NL	0.89	0.307	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	220.78	100.65	28	1.00	0.90	1.33	1.05	35	1.00	35	21.46	3.85	1.09	42	NL	1.00	0.57	0.71	1.00	1.00	NL	0.85	0.290	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	249.46	114.62	33	1.00	0.90	1.33	1.05	41	0.93	39	29.99	4.71	1.15	49	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.274	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	277.85	128.30	28	1.00	0.90	1.33	1.05	35	0.88	31	88.11	0.50	1.20	38	NL	1.00	0.57	0.71	0.93	1.00	NL	0.77	0.259	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	306.10	141.84	34	1.00	0.90	1.33	1.05	43	0.84	36	65.52	0.50	1.20	44	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.245	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	334.34	155.37	35	1.00	0.90	1.33	1.05	44	0.80	35	65.52	0.50	1.20	43	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.231	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	362.59	168.91	37	1.00	0.90	1.33	1.05	47	0.77	36	71.58	0.50	1.20	43	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.217	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.83	182.44	61	1.00	0.90	1.33	1.05	77	0.74	57	80.85	0.50	1.20	69	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	419.08	195.98	67	1.00	0.90	1.33	1.05	84	0.71	60	68.32	0.50	1.20	73	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	447.61	209.80	85	1.00	0.90	1.33	1.05	107	0.69	74	20.76	3.74	1.08	84	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	476.29	223.77	100	1.00	0.90	1.33	1.05	126	0.67	84	30.23	4.72	1.16	102	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.68	237.45	100	1.00	0.90	1.33	1.05	126	0.65	82	69.56	0.50	1.20	98	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.64	253.24	100	1.00	0.90	1.33	1.05	126	0.63	79	77.26	0.50	1.20	95	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	556.47	262.27	100	1.00	0.90	1.33	1.05	126	0.62	78	69.62	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-24
Chainage	2+920

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Greyish to Brownish Gray, fine-grained silt	0.00	9.25	17.95	8.14
2	Dense, Brownish to Yellow Brownish, fine-grained silty sand(SM)	9.25	19.00	19.12	9.31
3	Very Dense, Brownish, fine-grained silty sand(SM)	19.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.44	10.18	8	0.75	0.90	1.33	1.05	8	1.70	13	24.20	4.20	1.11	18	0.20	1.00	0.13	0.80	1.58	1.00	0.31	0.99	0.341	0.91	Liquefiable Soil
2	2.50	4.00	3.25	58.34	26.47	14	0.80	0.90	1.33	1.05	14	1.70	24	24.20	4.20	1.11	31	NL	1.00	0.24	0.80	1.30	1.00	NL	0.98	0.335	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	85.26	38.68	21	0.85	0.90	1.33	1.05	22	1.61	36	28.60	4.61	1.14	46	NL	1.00	0.37	0.80	1.21	1.00	NL	0.96	0.331	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	112.19	50.90	26	0.95	0.90	1.33	1.05	31	1.40	44	18.40	3.32	1.07	50	NL	1.00	0.51	0.75	1.19	1.00	NL	0.95	0.327	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.11	63.11	28	0.95	0.90	1.33	1.05	33	1.26	42	30.72	4.75	1.16	54	NL	1.00	0.55	0.73	1.13	1.00	NL	0.94	0.323	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	166.04	75.33	31	0.95	0.90	1.33	1.05	37	1.15	43	26.90	4.47	1.13	53	NL	1.00	0.60	0.70	1.09	1.00	NL	0.93	0.320	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	194.72	89.30	35	1.00	0.90	1.33	1.05	44	1.06	47	20.34	3.67	1.08	54	NL	1.00	0.85	0.60	1.05	1.00	NL	0.89	0.302	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	223.40	103.27	39	1.00	0.90	1.33	1.05	49	0.98	48	20.34	3.67	1.08	56	NL	1.00	0.85	0.60	0.99	1.00	NL	0.85	0.286	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	252.08	117.24	41	1.00	0.90	1.33	1.05	52	0.92	48	26.12	4.40	1.12	58	NL	1.00	0.85	0.60	0.94	1.00	NL	0.81	0.271	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	280.76	131.21	44	1.00	0.90	1.33	1.05	55	0.87	48	27.10	4.49	1.13	59	NL	1.00	0.85	0.60	0.90	1.00	NL	0.77	0.256	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	309.44	145.18	47	1.00	0.90	1.33	1.05	59	0.83	49	29.45	4.67	1.15	61	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.242	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	338.12	159.15	50	1.00	0.90	1.33	1.05	63	0.79	50	32.94	4.88	1.18	64	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.228	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	367.46	173.78	53	1.00	0.90	1.33	1.05	67	0.76	51	25.19	4.31	1.12	61	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.213	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	397.46	189.07	54	1.00	0.90	1.33	1.05	68	0.73	49	29.30	4.66	1.15	61	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.199	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	427.46	204.36	55	1.00	0.90	1.33	1.05	69	0.70	48	18.92	3.42	1.07	55	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.185	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	457.46	219.65	60	1.00	0.90	1.33	1.05	75	0.67	51	28.39	4.59	1.14	63	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.171	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	487.46	234.94	65	1.00	0.90	1.33	1.05	82	0.65	53	18.63	3.36	1.07	60	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.157	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	517.46	250.23	78	1.00	0.90	1.33	1.05	98	0.63	62	30.93	4.77	1.16	77	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	552.46	268.06	100	1.00	0.90	1.33	1.05	126	0.61	77	21.70	3.88	1.09	88	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	572.46	278.26	100	1.00	0.90	1.33	1.05	126	0.60	75	28.60	4.61	1.14	91	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-25
Chainage	3+033

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff, Yellowish to Brownish, fine-grained inorganic silt of low	0.00	4.00	17.00	7.19
2	Medium Dense to Dense, Greyish to Brownish Gray, fine-grained silt	4.00	14.25	19.12	9.31
3	Hard, Yellowish to Brownish, fine-grained inorganic silt of low Plastici	14.25	17.25	19.22	9.41
4	Very Dense, Greyish to Brownish Gray, fine-grained silty sand(SM)	17.25	22.00	20.00	10.19
5	Hard, Yellowish to Brownish, fine-grained inorganic silt of low Plastici	22.00	26.25	19.22	9.41
6	Very Dense, Greyish to Brownish Gray, fine-grained silty sand(SM)	26.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	7	0.75	0.90	1.33	1.05	7	1.70	11	66.68	0.50	1.20	14	0.15	1.00	0.10	0.80	1.62	1.00	0.24	0.99	0.365	0.66	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	8	0.80	0.90	1.33	1.05	8	1.70	14	66.68	0.50	1.20	17	0.18	1.00	0.15	0.80	1.34	1.00	0.24	0.98	0.360	0.67	Liquefiable Soil
3	4.00	5.50	4.75	82.34	35.76	14	0.85	0.90	1.33	1.05	15	1.67	25	28.57	4.61	1.14	33	NL	1.00	0.26	0.80	1.23	1.00	NL	0.96	0.346	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	111.02	49.73	21	0.95	0.90	1.33	1.05	25	1.42	36	28.57	4.61	1.14	45	NL	1.00	0.41	0.79	1.16	1.00	NL	0.95	0.332	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.70	63.70	27	0.95	0.90	1.33	1.05	32	1.25	40	24.14	4.20	1.11	49	NL	1.00	0.53	0.74	1.13	1.00	NL	0.94	0.322	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	168.38	77.67	30	0.95	0.90	1.33	1.05	36	1.13	41	44.22	0.50	1.20	49	NL	1.00	0.58	0.71	1.08	1.00	NL	0.93	0.314	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	197.06	91.64	39	1.00	0.90	1.33	1.05	49	1.04	51	30.37	4.73	1.16	64	NL	1.00	0.85	0.60	1.04	1.00	NL	0.89	0.298	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	225.74	105.61	39	1.00	0.90	1.33	1.05	49	0.97	48	36.09	0.50	1.20	58	NL	1.00	0.85	0.60	0.98	1.00	NL	0.85	0.282	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	254.42	119.58	45	1.00	0.90	1.33	1.05	57	0.91	52	18.58	3.35	1.07	59	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.268	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	283.20	133.65	50	1.00	0.90	1.33	1.05	63	0.87	54	92.65	0.50	1.20	66	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.253	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	312.03	147.77	52	1.00	0.90	1.33	1.05	65	0.82	54	78.85	0.50	1.20	65	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.239	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	341.64	162.67	51	1.00	0.90	1.33	1.05	64	0.78	50	43.40	0.50	1.20	61	NL	1.00	0.85	0.60	0.82	2.00	NL	0.69	0.225	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	371.64	177.96	60	1.00	0.90	1.33	1.05	75	0.75	57	30.26	4.72	1.16	70	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.211	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	401.64	193.25	65	1.00	0.90	1.33	1.05	82	0.72	59	44.74	0.50	1.20	71	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.197	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	431.06	207.95	70	1.00	0.90	1.33	1.05	88	0.69	61	72.97	0.50	1.20	74	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.183	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	459.89	222.07	75	1.00	0.90	1.33	1.05	94	0.67	63	50.40	0.50	1.20	76	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.170	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	488.72	236.19	86	1.00	0.90	1.33	1.05	108	0.65	70	73.33	0.50	1.20	85	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.157	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	517.55	250.31	100	1.00	0.90	1.33	1.05	126	0.63	79	34.36	4.95	1.19	100	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	551.18	266.79	100	1.00	0.90	1.33	1.05	126	0.61	77	28.79	4.62	1.14	93	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	570.40	276.20	100	1.00	0.90	1.33	1.05	126	0.60	76	42.00	0.50	1.20	91	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-26
Chainage	3+122

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Gray Brownish, fine-grained silty sand (SM)	0.00	4.00	16.97	7.16
2	Medium Dense, Greyish, fine-grained silty sand (SM)	4.00	13.00	17.55	7.74
3	Hard, Yellowish Brown to Brownish, fine-grained inorganic silt of low P	13.00	23.25	19.22	9.41
4	Very Dense, Yellowish Red to Greyish, fine-grained silty sand (SM)	23.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	21.21	8.95	9	0.75	0.90	1.33	1.05	8	1.70	14	20.36	3.68	1.08	19	0.21	1.00	0.16	0.80	1.62	1.00	0.33	0.99	0.366	0.91	Liquefiable Soil
2	2.50	4.00	3.25	55.15	23.28	10	0.80	0.90	1.33	1.05	10	1.70	17	20.36	3.68	1.08	22	0.24	1.00	0.18	0.80	1.34	1.00	0.33	0.98	0.360	0.91	Liquefiable Soil
3	4.00	5.50	4.75	81.04	34.46	11	0.85	0.90	1.33	1.05	12	1.70	20	29.90	4.70	1.15	28	0.36	1.00	0.21	0.80	1.24	1.00	0.45	0.96	0.354	1.26	Non Liquefiable Soil
4	5.50	7.00	6.25	107.37	46.08	13	0.95	0.90	1.33	1.05	16	1.47	23	25.18	4.31	1.12	30	0.46	1.00	0.27	0.80	1.17	1.00	0.53	0.95	0.346	1.54	Non Liquefiable Soil
5	7.00	8.50	7.75	133.69	57.69	12	0.95	0.90	1.33	1.05	14	1.32	19	30.61	4.75	1.16	27	0.33	1.00	0.25	0.80	1.12	1.00	0.37	0.94	0.340	1.08	Liquefiable Soil
6	8.50	10.00	9.25	160.02	69.31	19	0.95	0.90	1.33	1.05	23	1.20	27	22.80	4.03	1.10	34	NL	1.00	0.38	0.80	1.08	1.00	NL	0.93	0.335	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.34	80.92	24	1.00	0.90	1.33	1.05	30	1.11	34	23.12	4.07	1.10	41	NL	1.00	0.49	0.75	1.05	1.00	NL	0.89	0.319	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.67	92.54	30	1.00	0.90	1.33	1.05	38	1.04	39	27.57	4.53	1.13	49	NL	1.00	0.61	0.69	1.02	1.00	NL	0.85	0.304	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	240.25	105.40	32	1.00	0.90	1.33	1.05	40	0.97	39	26.50	4.43	1.13	49	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.287	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.08	119.52	28	1.00	0.90	1.33	1.05	35	0.91	32	69.50	0.50	1.20	39	NL	1.00	0.57	0.71	0.95	1.00	NL	0.77	0.269	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	297.91	133.64	33	1.00	0.90	1.33	1.05	41	0.87	36	69.50	0.50	1.20	44	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.253	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	326.74	147.76	36	1.00	0.90	1.33	1.05	45	0.82	37	62.57	0.50	1.20	45	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.237	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	355.57	161.88	38	1.00	0.90	1.33	1.05	48	0.79	38	70.11	0.50	1.20	46	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.222	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	384.40	176.00	77	1.00	0.90	1.33	1.05	97	0.75	73	66.51	0.50	1.20	88	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	413.23	190.12	85	1.00	0.90	1.33	1.05	107	0.73	77	75.00	0.50	1.20	93	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	442.84	205.02	100	1.00	0.90	1.33	1.05	126	0.70	88	25.21	4.31	1.12	102	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	472.84	220.31	100	1.00	0.90	1.33	1.05	126	0.67	85	26.70	4.45	1.13	100	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	502.84	235.60	100	1.00	0.90	1.33	1.05	126	0.65	82	27.79	4.54	1.14	98	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.84	253.44	100	1.00	0.90	1.33	1.05	126	0.63	79	22.60	4.01	1.10	91	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	557.84	263.64	100	1.00	0.90	1.33	1.05	126	0.62	77	21.43	3.84	1.09	88	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-27
Chainage	3+205

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Greyish to Brownish Grey, fine-grained silt	0.00	8.25	16.97	7.16
2	Dense, Brownish Grey, fine-grained silty sand and Gravel (SM)	8.25	13.00	19.12	9.31
3	Very Dense, Brownish to Yellowish, fine-grained silty sand and Grav	13.00	20.25	20.00	10.19
4	Very Dense, Yellowish to Brownish, fine-grained silty sand and Grav	20.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	21.21	8.95	9	0.75	0.90	1.33	1.05	8	1.70	14	30.17	4.72	1.16	21	0.23	1.00	0.16	0.80	1.62	1.00	0.38	0.99	0.366	1.03	Liquefiable Soil
2	2.50	4.00	3.25	55.15	23.28	11	0.80	0.90	1.33	1.05	11	1.70	19	30.17	4.72	1.16	26	0.32	1.00	0.20	0.80	1.34	1.00	0.43	0.98	0.360	1.20	Non Liquefiable Soil
3	4.00	5.50	4.75	80.61	34.03	14	0.85	0.90	1.33	1.05	15	1.70	25	28.38	4.59	1.14	34	NL	1.00	0.26	0.80	1.24	1.00	NL	0.96	0.356	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.06	44.77	20	0.95	0.90	1.33	1.05	24	1.49	36	22.70	4.02	1.10	43	NL	1.00	0.40	0.80	1.17	1.00	NL	0.95	0.352	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	131.52	55.52	28	0.95	0.90	1.33	1.05	33	1.34	45	28.34	4.59	1.14	56	NL	1.00	0.55	0.73	1.17	1.00	NL	0.94	0.348	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.12	68.41	34	0.95	0.90	1.33	1.05	41	1.21	49	24.20	4.20	1.11	59	NL	1.00	0.85	0.60	1.16	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.80	82.38	40	1.00	0.90	1.33	1.05	50	1.10	55	24.20	4.20	1.11	66	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.315	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	216.48	96.35	50	1.00	0.90	1.33	1.05	63	1.02	64	22.05	3.93	1.09	74	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.297	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	245.82	110.98	52	1.00	0.90	1.33	1.05	65	0.95	62	27.70	4.54	1.14	75	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.279	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	275.82	126.27	57	1.00	0.90	1.33	1.05	72	0.89	64	22.95	4.05	1.10	74	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.261	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	305.82	141.56	69	1.00	0.90	1.33	1.05	87	0.84	73	26.22	4.41	1.12	86	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.245	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	335.82	156.85	67	1.00	0.90	1.33	1.05	84	0.80	67	20.80	3.75	1.08	77	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.229	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	365.82	172.14	73	1.00	0.90	1.33	1.05	92	0.76	70	19.70	3.56	1.08	79	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.214	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	395.82	187.43	70	1.00	0.90	1.33	1.05	88	0.73	64	21.82	3.90	1.09	74	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	425.82	202.72	71	1.00	0.90	1.33	1.05	89	0.70	63	21.50	3.85	1.09	72	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.186	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	455.82	218.01	72	1.00	0.90	1.33	1.05	90	0.68	61	27.41	4.51	1.13	74	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.172	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	485.82	233.30	100	1.00	0.90	1.33	1.05	126	0.65	82	26.35	4.42	1.13	97	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	515.82	248.59	100	1.00	0.90	1.33	1.05	126	0.63	80	24.41	4.23	1.11	93	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.145	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	550.82	266.43	100	1.00	0.90	1.33	1.05	126	0.61	77	27.69	4.54	1.14	92	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	570.82	276.62	100	1.00	0.90	1.33	1.05	126	0.60	76	21.99	3.92	1.09	87	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-28
Chainage	3+304

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Little Greyish, fine-grained silty sand (SM)	0.00	8.25	16.97	7.16
2	Medium Dense, Greyish, fine-grained silty sand (SM)	8.25	13.00	17.55	7.74
3	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand	13.00	20.25	19.22	9.41
4	Hard, Yellowish to Brownish, fine-grained inorganic silt of low Plastici	20.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.21	8.95	6	0.75	0.90	1.33	1.05	6	1.70	10	20.91	3.76	1.09	14	0.15	1.00	0.06	0.80	1.62	1.00	0.25	0.99	0.366	0.67	Liquefiable Soil
2	2.50	4.00	3.25	55.15	23.28	7	0.80	0.90	1.33	1.05	7	1.70	12	16.96	3.00	1.06	16	0.17	1.00	0.11	0.80	1.34	1.00	0.22	0.98	0.360	0.62	Liquefiable Soil
3	4.00	5.50	4.75	80.61	34.03	9	0.85	0.90	1.33	1.05	10	1.70	16	17.25	3.07	1.06	20	0.22	1.00	0.17	0.80	1.24	1.00	0.27	0.96	0.356	0.77	Liquefiable Soil
4	5.50	7.00	6.25	106.06	44.77	11	0.95	0.90	1.33	1.05	13	1.49	20	23.21	4.08	1.10	26	0.31	1.00	0.23	0.80	1.17	1.00	0.36	0.95	0.352	1.02	Liquefiable Soil
5	7.00	8.50	7.75	131.52	55.52	15	0.95	0.90	1.33	1.05	18	1.34	24	22.94	4.05	1.10	30	NL	1.00	0.30	0.80	1.12	1.00	NL	0.94	0.348	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.55	66.84	17	0.95	0.90	1.33	1.05	20	1.22	25	22.94	4.05	1.10	31	NL	1.00	0.34	0.80	1.08	1.00	NL	0.93	0.342	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	183.88	78.46	20	1.00	0.90	1.33	1.05	25	1.13	28	24.15	4.20	1.11	36	NL	1.00	0.42	0.79	1.05	1.00	NL	0.89	0.324	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	210.20	90.07	24	1.00	0.90	1.33	1.05	30	1.05	32	24.15	4.20	1.11	39	NL	1.00	0.49	0.75	1.03	1.00	NL	0.85	0.308	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	237.78	102.94	44	1.00	0.90	1.33	1.05	55	0.99	55	74.23	0.50	1.20	66	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.291	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	266.61	117.06	50	1.00	0.90	1.33	1.05	63	0.92	58	60.18	0.50	1.20	70	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.272	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	295.44	131.18	43	1.00	0.90	1.33	1.05	54	0.87	47	77.37	0.50	1.20	57	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.255	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	324.27	145.30	47	1.00	0.90	1.33	1.05	59	0.83	49	83.34	0.50	1.20	59	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.239	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	353.10	159.42	56	1.00	0.90	1.33	1.05	70	0.79	56	64.10	0.50	1.20	67	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	382.71	174.32	52	1.00	0.90	1.33	1.05	65	0.76	50	78.21	0.50	1.20	60	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.208	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	412.71	189.61	55	1.00	0.90	1.33	1.05	69	0.73	50	75.54	0.50	1.20	61	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	442.71	204.90	50	1.00	0.90	1.33	1.05	63	0.70	44	80.36	0.50	1.20	53	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	472.71	220.19	38	1.00	0.90	1.33	1.05	48	0.67	32	67.00	0.50	1.20	39	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	502.71	235.48	49	1.00	0.90	1.33	1.05	62	0.65	40	81.80	0.50	1.20	49	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.71	253.32	41	1.00	0.90	1.33	1.05	52	0.63	32	71.06	0.50	1.20	39	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	557.71	263.51	49	1.00	0.90	1.33	1.05	62	0.62	38	79.86	0.50	1.20	46	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-28A
Chainage	3+367

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff to Very Stiff, Brownish Yellow Whiteish Grey, fine-grained inorga	0.00	7.00	17.95	8.14
2	Medium Dense, Whiteish Grey, fine-grained silty sand (SM)	7.00	12.25	17.55	7.74
3	Very Stiff to Hard, Brownish to Yellowish, fine-grained inorganic silt c	12.25	20.25	18.83	9.02
4	Dense, Yellowish to Brownish, fine-grained silty sand and Gravel (SN	20.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.44	10.18	12	0.75	0.90	1.33	1.05	11	1.70	19	72.17	0.50	1.20	24	0.27	1.00	0.20	0.80	1.58	1.00	0.42	0.99	0.341	1.23	Non Liquefiable Soil
2	2.50	4.00	3.25	58.34	26.47	12	0.80	0.90	1.33	1.05	12	1.70	21	72.17	0.50	1.20	25	0.29	1.00	0.21	0.80	1.30	1.00	0.38	0.98	0.335	1.14	Liquefiable Soil
3	4.00	5.50	4.75	85.26	38.68	14	0.85	0.90	1.33	1.05	15	1.61	24	69.39	0.50	1.20	29	0.43	1.00	0.26	0.80	1.21	1.00	0.52	0.96	0.331	1.56	Non Liquefiable Soil
4	5.50	7.00	6.25	112.19	50.90	22	0.95	0.90	1.33	1.05	26	1.40	37	69.39	0.50	1.20	45	NL	1.00	0.43	0.78	1.16	1.00	NL	0.95	0.327	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	138.81	62.81	19	0.95	0.90	1.33	1.05	23	1.26	29	23.63	4.14	1.10	36	NL	1.00	0.38	0.80	1.10	1.00	NL	0.94	0.324	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	165.14	74.43	16	0.95	0.90	1.33	1.05	19	1.16	22	25.95	4.38	1.12	29	0.42	1.00	0.32	0.80	1.06	1.00	0.45	0.93	0.322	1.39	Non Liquefiable Soil
7	10.00	11.50	10.75	191.46	86.04	26	1.00	0.90	1.33	1.05	33	1.08	35	24.82	4.27	1.11	44	NL	1.00	0.53	0.73	1.04	1.00	NL	0.89	0.308	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	217.79	97.66	31	1.00	0.90	1.33	1.05	39	1.01	39	24.82	4.27	1.11	48	NL	1.00	0.63	0.68	1.01	1.00	NL	0.85	0.295	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	246.03	111.19	31	1.00	0.90	1.33	1.05	39	0.95	37	69.45	0.50	1.20	45	NL	1.00	0.63	0.68	0.97	1.00	NL	0.81	0.279	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	274.28	124.73	29	1.00	0.90	1.33	1.05	36	0.90	33	85.34	0.50	1.20	40	NL	1.00	0.59	0.70	0.94	1.00	NL	0.77	0.263	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	302.52	138.26	33	1.00	0.90	1.33	1.05	41	0.85	35	72.38	0.50	1.20	43	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.248	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.77	151.80	29	1.00	0.90	1.33	1.05	36	0.81	30	88.02	0.50	1.20	36	NL	1.00	0.59	0.70	0.88	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	359.01	165.33	34	1.00	0.90	1.33	1.05	43	0.78	33	68.42	0.50	1.20	40	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.219	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	387.93	179.54	30	1.00	0.90	1.33	1.05	38	0.75	28	39.02	0.50	1.20	34	NL	1.00	0.61	0.69	0.84	4.00	NL	0.61	0.204	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	417.18	194.08	33	1.00	0.90	1.33	1.05	41	0.72	30	19.49	3.52	1.08	36	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.190	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	446.43	208.62	36	1.00	0.90	1.33	1.05	45	0.69	31	37.98	0.50	1.20	38	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.176	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	475.68	223.16	38	1.00	0.90	1.33	1.05	48	0.67	32	27.11	4.49	1.13	41	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.93	237.70	44	1.00	0.90	1.33	1.05	55	0.65	36	36.66	0.50	1.20	44	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	539.05	254.66	47	1.00	0.90	1.33	1.05	59	0.63	37	24.55	4.24	1.11	45	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	558.55	264.35	37	1.00	0.90	1.33	1.05	47	0.62	29	14.21	2.27	1.04	32	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-29
Chainage	3+391

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Whiteish to Brownish, fine-grained silty sand (SM)	0.00	8.25	17.55	7.74
2	Dense, Brownish to Yellowish, fine-grained silty sand (SM)	8.25	16.00	19.12	9.31
3	Very Stiff to Hard, Yellowish, fine-grained inorganic silt of low Plastic	16.00	22.00	19.22	9.41
4	Dense, Yellowish Brown, fine-grained silty sand (SM)	22.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.94	9.68	12	0.75	0.90	1.33	1.05	11	1.70	19	20.69	3.73	1.08	25	0.28	1.00	0.20	0.80	1.60	1.00	0.45	0.99	0.350	1.29	Non Liquefiable Soil
2	2.50	4.00	3.25	57.04	25.17	12	0.80	0.90	1.33	1.05	12	1.70	21	20.69	3.73	1.08	26	0.31	1.00	0.21	0.80	1.32	1.00	0.41	0.98	0.345	1.19	Liquefiable Soil
3	4.00	5.50	4.75	83.36	36.78	17	0.85	0.90	1.33	1.05	18	1.65	30	26.40	4.43	1.13	38	NL	1.00	0.31	0.80	1.22	1.00	NL	0.96	0.341	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	109.69	48.40	20	0.95	0.90	1.33	1.05	24	1.44	34	20.80	3.75	1.08	41	NL	1.00	0.40	0.80	1.16	1.00	NL	0.95	0.337	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	136.01	60.01	21	0.95	0.90	1.33	1.05	25	1.29	32	26.90	4.47	1.13	41	NL	1.00	0.41	0.79	1.11	1.00	NL	0.94	0.333	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	163.91	73.20	30	0.95	0.90	1.33	1.05	36	1.17	42	26.90	4.47	1.13	52	NL	1.00	0.58	0.71	1.10	1.00	NL	0.93	0.325	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	192.59	87.17	33	1.00	0.90	1.33	1.05	41	1.07	44	30.40	4.73	1.16	56	NL	1.00	0.85	0.60	1.06	1.00	NL	0.89	0.306	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	221.27	101.14	34	1.00	0.90	1.33	1.05	43	0.99	42	19.82	3.58	1.08	49	NL	1.00	0.85	0.60	1.00	1.00	NL	0.85	0.289	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	249.95	115.11	40	1.00	0.90	1.33	1.05	50	0.93	47	26.92	4.47	1.13	57	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.273	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	278.63	129.08	40	1.00	0.90	1.33	1.05	50	0.88	44	21.14	3.80	1.09	52	NL	1.00	0.85	0.60	0.90	1.00	NL	0.77	0.258	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	307.38	143.12	24	1.00	0.90	1.33	1.05	30	0.84	25	71.06	0.50	1.20	31	NL	1.00	0.49	0.75	0.92	1.00	NL	0.73	0.244	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	336.21	157.24	40	1.00	0.90	1.33	1.05	50	0.80	40	73.20	0.50	1.20	49	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.229	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	365.04	171.36	36	1.00	0.90	1.33	1.05	45	0.76	35	75.96	0.50	1.20	42	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.215	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	393.87	185.48	38	1.00	0.90	1.33	1.05	48	0.73	35	73.95	0.50	1.20	43	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.201	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	422.91	199.81	23	1.00	0.90	1.33	1.05	29	0.71	20	29.36	4.66	1.15	28	0.38	1.00	0.47	0.76	0.85	5.00	1.59	0.57	0.187	8.51	Non Liquefiable Soil
16	23.50	25.00	24.25	452.16	214.35	38	1.00	0.90	1.33	1.05	48	0.68	33	20.48	3.70	1.08	39	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	481.41	228.89	30	1.00	0.90	1.33	1.05	38	0.66	25	30.96	4.77	1.16	34	NL	1.00	0.61	0.69	0.78	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	510.66	243.43	34	1.00	0.90	1.33	1.05	43	0.64	27	27.13	4.49	1.13	35	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	544.79	260.39	41	1.00	0.90	1.33	1.05	52	0.62	32	27.66	4.53	1.14	41	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	564.29	270.09	42	1.00	0.90	1.33	1.05	53	0.61	32	23.24	4.09	1.10	39	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.122	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-30
Chainage	3+514

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff to Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity	0.00	8.25	17.95	8.14
2	Medium Dense, Brownish, fine-grained silty sand and Gravel (SM)	8.25	16.00	17.55	7.74
3	Dense Brownish to Whiteish, fine-grained silty sand (SM)	16.00	22.00	19.12	9.31
4	Dense to Very Dense, Yellowish Brownish, fine-grained silty sand an	22.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.44	10.18	12	0.75	0.90	1.33	1.05	11	1.70	19	67.59	0.50	1.20	24	0.27	1.00	0.20	0.80	1.58	1.00	0.42	0.99	0.341	1.23	Non Liquefiable Soil
2	2.50	4.00	3.25	58.34	26.47	12	0.80	0.90	1.33	1.05	12	1.70	21	67.59	0.50	1.20	25	0.29	1.00	0.21	0.80	1.30	1.00	0.38	0.98	0.335	1.14	Liquefiable Soil
3	4.00	5.50	4.75	85.26	38.68	19	0.85	0.90	1.33	1.05	20	1.61	33	77.77	0.50	1.20	40	NL	1.00	0.34	0.80	1.21	1.00	NL	0.96	0.331	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	112.19	50.90	17	0.95	0.90	1.33	1.05	20	1.40	28	77.77	0.50	1.20	35	NL	1.00	0.34	0.80	1.14	1.00	NL	0.95	0.327	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.11	63.11	21	0.95	0.90	1.33	1.05	25	1.26	32	25.01	4.29	1.12	39	NL	1.00	0.41	0.79	1.10	1.00	NL	0.94	0.323	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	165.64	74.93	22	0.95	0.90	1.33	1.05	26	1.16	30	30.01	4.71	1.15	40	NL	1.00	0.43	0.78	1.06	1.00	NL	0.93	0.320	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.96	86.54	25	1.00	0.90	1.33	1.05	31	1.07	34	23.92	4.17	1.11	42	NL	1.00	0.51	0.74	1.04	1.00	NL	0.89	0.307	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.29	98.16	20	1.00	0.90	1.33	1.05	25	1.01	25	19.81	3.58	1.08	31	NL	1.00	0.42	0.79	1.00	1.00	NL	0.85	0.294	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.61	109.77	26	1.00	0.90	1.33	1.05	33	0.95	31	23.59	4.13	1.10	39	NL	1.00	0.53	0.73	0.98	1.00	NL	0.81	0.280	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	270.94	121.39	32	1.00	0.90	1.33	1.05	40	0.91	37	37.90	0.50	1.20	44	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.267	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	298.44	134.18	36	1.00	0.90	1.33	1.05	45	0.86	39	24.57	4.24	1.11	48	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.252	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	327.12	148.15	37	1.00	0.90	1.33	1.05	47	0.82	38	16.04	2.78	1.05	43	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.237	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	355.80	162.12	43	1.00	0.90	1.33	1.05	54	0.79	42	19.83	3.59	1.08	49	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.221	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	384.48	176.09	47	1.00	0.90	1.33	1.05	59	0.75	45	7.41	0.18	1.01	45	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	413.45	190.34	52	1.00	0.90	1.33	1.05	65	0.72	47	24.60	4.25	1.11	57	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	442.70	204.88	60	1.00	0.90	1.33	1.05	75	0.70	53	25.80	4.37	1.12	63	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	471.95	219.42	34	1.00	0.90	1.33	1.05	43	0.68	29	20.96	3.77	1.09	35	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	501.20	233.96	38	1.00	0.90	1.33	1.05	48	0.65	31	19.36	3.50	1.08	37	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	535.32	250.93	43	1.00	0.90	1.33	1.05	54	0.63	34	25.39	4.33	1.12	42	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	554.82	260.62	55	1.00	0.90	1.33	1.05	69	0.62	43	28.90	4.63	1.15	54	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

B.5. Zone 5: CH: 3+515 km to 4+520 km (BH-31 to BH-40)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-31	8.50	10.00	14	17	20	24	0.29	0.33	0.90	Liquefiable Soil
BH-32	0.00	2.50	10	9	16	24	0.45	0.38	1.19	Liquefiable Soil
BH-32	2.50	4.00	10	10	17	25	0.41	0.37	1.08	Liquefiable Soil
BH-33	0.00	2.50	9	8	14	20	0.34	0.36	0.94	Liquefiable Soil
BH-33	2.50	4.00	10	10	17	23	0.33	0.36	0.94	Liquefiable Soil
BH-34	0.00	2.50	5	5	8	14	0.24	0.38	0.64	Liquefiable Soil
BH-34	2.50	4.00	8	8	14	17	0.24	0.37	0.65	Liquefiable Soil
BH-34	4.00	5.50	10	11	18	25	0.38	0.37	1.02	Liquefiable Soil
BH-35	0.00	2.50	5	5	8	10	0.18	0.36	0.51	Liquefiable Soil
BH-35	2.50	4.00	10	10	17	21	0.30	0.36	0.85	Liquefiable Soil
BH-35	4.00	5.50	11	12	20	24	0.35	0.35	0.99	Liquefiable Soil
BH-37	0.00	2.50	8	8	13	16	0.27	0.36	0.75	Liquefiable Soil
BH-37	16.00	17.50	19	24	20	25	0.28	0.25	1.12	Liquefiable Soil
BH-38	0.00	2.50	7	7	11	14	0.24	0.36	0.67	Liquefiable Soil
BH-39	0.00	2.50	7	7	11	14	0.24	0.36	0.67	Liquefiable Soil
BH-39	5.50	7.00	10	12	17	23	0.31	0.34	0.90	Liquefiable Soil
BH-40	0.00	2.50	6	6	10	12	0.22	0.38	0.56	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-31
Chainage	3+643

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff, Brownish, fine-grained inorganic silt of low Plasticity with sand an	0.00	4.00	17.10	7.29
2	Medium Dense, Brownish Grey to Dark Brownish, fine-grained silty sand	4.00	16.00	18.00	8.19
3	Dense, Brownish, fine-grained silty sand with Gravel (SM)	16.00	28.00	19.50	9.69
4	Very Dense, Brownish, fine-grained silty sand with Gravel (SM)	28.00	30.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	15	0.75	0.90	1.33	1.05	14	1.70	24	67.68	0.50	1.20	29	0.43	1.00	0.24	0.80	1.61	1.00	0.69	0.99	0.362	1.91	Non Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	15	0.80	0.90	1.33	1.05	15	1.70	26	67.68	0.50	1.20	31	NL	1.00	0.26	0.80	1.33	1.00	NL	0.98	0.357	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	81.90	35.32	17	0.85	0.90	1.33	1.05	18	1.68	31	27.42	4.51	1.13	39	NL	1.00	0.31	0.80	1.23	1.00	NL	0.96	0.349	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	108.90	47.61	17	0.95	0.90	1.33	1.05	20	1.45	29	46.02	0.50	1.20	36	NL	1.00	0.34	0.80	1.16	1.00	NL	0.95	0.340	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	135.90	59.90	20	0.95	0.90	1.33	1.05	24	1.29	31	21.27	3.82	1.09	37	NL	1.00	0.40	0.80	1.11	1.00	NL	0.94	0.333	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	162.90	72.19	14	0.95	0.90	1.33	1.05	17	1.18	20	35.82	0.50	1.20	24	0.28	1.00	0.28	0.80	1.07	1.00	0.29	0.93	0.327	0.90	Liquefiable Soil
7	10.00	11.50	10.75	189.90	84.48	15	1.00	0.90	1.33	1.05	19	1.09	21	32.00	4.83	1.17	29	0.40	1.00	0.32	0.80	1.03	1.00	0.42	0.89	0.311	1.34	Non Liquefiable Soil
8	11.50	13.00	12.25	216.90	96.77	19	1.00	0.90	1.33	1.05	24	1.02	24	17.53	3.13	1.06	29	0.41	1.00	0.40	0.80	1.01	1.00	0.41	0.85	0.296	1.39	Non Liquefiable Soil
9	13.00	14.50	13.75	243.90	109.06	23	1.00	0.90	1.33	1.05	29	0.96	28	23.42	4.11	1.10	35	NL	1.00	0.47	0.76	0.98	1.00	NL	0.81	0.282	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	270.90	121.35	28	1.00	0.90	1.33	1.05	35	0.91	32	25.54	4.34	1.12	40	NL	1.00	0.57	0.71	0.95	1.00	NL	0.77	0.267	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	299.03	134.76	45	1.00	0.90	1.33	1.05	57	0.86	49	20.17	3.64	1.08	56	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.252	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	328.28	149.30	40	1.00	0.90	1.33	1.05	50	0.82	41	19.39	3.51	1.08	48	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.236	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	357.53	163.84	37	1.00	0.90	1.33	1.05	47	0.78	36	20.80	3.75	1.08	43	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.220	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	386.78	178.38	34	1.00	0.90	1.33	1.05	43	0.75	32	16.24	2.83	1.06	37	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.205	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	416.03	192.92	33	1.00	0.90	1.33	1.05	41	0.72	30	22.38	3.98	1.10	37	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.191	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	445.28	207.46	36	1.00	0.90	1.33	1.05	45	0.69	31	19.40	3.51	1.08	37	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.176	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	474.53	222.00	41	1.00	0.90	1.33	1.05	52	0.67	35	22.41	3.98	1.10	42	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	503.78	236.54	45	1.00	0.90	1.33	1.05	57	0.65	37	20.30	3.67	1.08	43	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	538.40	254.01	55	1.00	0.90	1.33	1.05	69	0.63	43	23.64	4.14	1.10	52	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	558.40	264.20	53	1.00	0.90	1.33	1.05	67	0.62	41	22.68	4.02	1.10	49	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-32
Chainage	3+730

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Whiteish Grey, fine-grained silty sand(SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Brownish, fine-grained silty sand with gravel (SM)	4.00	12.25	18.00	8.19
3	Dense, Brownish, fine-grained silty sand with gravel (SM)	12.25	21.25	19.50	9.69
4	Very Dense, Brownish, fine-grained silty sand with gravel (SM)	21.25	30.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	10	0.75	0.90	1.33	1.05	9	1.70	16	34.80	4.97	1.20	24	0.28	1.00	0.17	0.80	1.64	1.00	0.45	0.99	0.381	1.19	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	10	0.80	0.90	1.33	1.05	10	1.70	17	34.80	4.97	1.20	25	0.30	1.00	0.18	0.80	1.36	1.00	0.41	0.98	0.375	1.08	Liquefiable Soil
3	4.00	5.50	4.75	79.50	32.92	13	0.85	0.90	1.33	1.05	14	1.70	24	21.12	3.80	1.09	29	0.43	1.00	0.24	0.80	1.25	1.00	0.54	0.96	0.363	1.49	Non Liquefiable Soil
4	5.50	7.00	6.25	106.50	45.21	15	0.95	0.90	1.33	1.05	18	1.49	27	21.12	3.80	1.09	33	NL	1.00	0.30	0.80	1.17	1.00	NL	0.95	0.350	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.50	57.50	18	0.95	0.90	1.33	1.05	21	1.32	28	15.22	2.56	1.05	32	NL	1.00	0.36	0.80	1.12	1.00	NL	0.94	0.341	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	160.50	69.79	17	0.95	0.90	1.33	1.05	20	1.20	24	31.99	4.83	1.17	33	NL	1.00	0.34	0.80	1.07	1.00	NL	0.93	0.333	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.50	82.08	28	1.00	0.90	1.33	1.05	35	1.10	39	26.60	4.44	1.13	48	NL	1.00	0.57	0.71	1.06	1.00	NL	0.89	0.316	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	214.50	94.37	36	1.00	0.90	1.33	1.05	45	1.03	47	22.74	4.03	1.10	55	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.300	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	243.75	108.91	40	1.00	0.90	1.33	1.05	50	0.96	48	24.71	4.26	1.11	58	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.282	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	273.00	123.45	40	1.00	0.90	1.33	1.05	50	0.90	45	25.14	4.30	1.12	55	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.265	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	302.25	137.99	43	1.00	0.90	1.33	1.05	54	0.85	46	25.97	4.39	1.12	56	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.248	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	331.50	152.53	47	1.00	0.90	1.33	1.05	59	0.81	48	20.72	3.73	1.08	56	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.75	167.07	49	1.00	0.90	1.33	1.05	62	0.77	48	22.98	4.06	1.10	56	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.00	181.61	52	1.00	0.90	1.33	1.05	65	0.74	48	22.91	4.05	1.10	57	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.00	196.90	56	1.00	0.90	1.33	1.05	70	0.71	50	18.99	3.43	1.07	57	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	450.00	212.19	60	1.00	0.90	1.33	1.05	75	0.69	52	16.52	2.90	1.06	58	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.00	227.48	52	1.00	0.90	1.33	1.05	65	0.66	43	15.47	2.63	1.05	48	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	510.00	242.77	55	1.00	0.90	1.33	1.05	69	0.64	44	8.76	0.49	1.02	46	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	545.00	260.61	56	1.00	0.90	1.33	1.05	70	0.62	44	14.94	2.48	1.05	48	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	565.00	270.80	61	1.00	0.90	1.33	1.05	77	0.61	47	14.94	2.48	1.05	51	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-33
Chainage	3+792

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff, Brownish Grey, fine-grained inorganic silt of low Plasticity with s	0.00	5.25	17.10	7.29
2	Medium Dense, little Greyish to Gray Brownish, fine-grained silty san	5.25	9.25	18.00	8.19
3	Dense, Greyish, fine-grained silty sand (SM)	9.25	18.25	19.50	9.69
4	Very Dense, Brownish Grey to Brownish, fine-grained silty sand with	18.25	27.25	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	9	0.75	0.90	1.33	1.05	8	1.70	14	21.96	3.92	1.09	20	0.21	1.00	0.16	0.80	1.61	1.00	0.34	0.99	0.362	0.94	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	10	0.80	0.90	1.33	1.05	10	1.70	17	21.96	3.92	1.09	23	0.25	1.00	0.18	0.80	1.33	1.00	0.33	0.98	0.357	0.94	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	12	0.85	0.90	1.33	1.05	13	1.70	22	24.40	4.22	1.11	28	0.38	1.00	0.22	0.80	1.24	1.00	0.48	0.96	0.352	1.35	Non Liquefiable Soil
4	5.50	7.00	6.25	107.78	46.48	12	0.95	0.90	1.33	1.05	14	1.47	21	24.40	4.22	1.11	28	0.35	1.00	0.25	0.80	1.17	1.00	0.41	0.95	0.344	1.20	Non Liquefiable Soil
5	7.00	8.50	7.75	134.78	58.77	15	0.95	0.90	1.33	1.05	18	1.30	23	35.93	0.50	1.20	29	0.39	1.00	0.30	0.80	1.11	1.00	0.43	0.94	0.337	1.29	Non Liquefiable Soil
6	8.50	10.00	9.25	161.78	71.06	21	0.95	0.90	1.33	1.05	25	1.19	30	29.10	4.64	1.15	39	NL	1.00	0.41	0.79	1.07	1.00	NL	0.93	0.330	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.03	85.60	22	1.00	0.90	1.33	1.05	28	1.08	30	22.39	3.98	1.10	37	NL	1.00	0.46	0.77	1.04	1.00	NL	0.89	0.309	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	220.28	100.14	28	1.00	0.90	1.33	1.05	35	1.00	35	26.60	4.44	1.13	44	NL	1.00	0.57	0.71	1.00	1.00	NL	0.85	0.291	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	249.53	114.68	34	1.00	0.90	1.33	1.05	43	0.93	40	34.50	4.95	1.19	53	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.274	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	278.78	129.22	40	1.00	0.90	1.33	1.05	50	0.88	44	28.21	4.58	1.14	55	NL	1.00	0.85	0.60	0.90	1.00	NL	0.77	0.258	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	308.03	143.76	45	1.00	0.90	1.33	1.05	57	0.83	47	28.18	4.58	1.14	58	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.243	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	337.28	158.30	43	1.00	0.90	1.33	1.05	54	0.79	43	22.21	3.95	1.09	51	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.228	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	367.28	173.59	53	1.00	0.90	1.33	1.05	67	0.76	51	25.35	4.32	1.12	61	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.213	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	397.28	188.88	61	1.00	0.90	1.33	1.05	77	0.73	56	28.34	4.59	1.14	68	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.199	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	427.28	204.17	64	1.00	0.90	1.33	1.05	80	0.70	56	22.62	4.01	1.10	66	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.185	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	457.28	219.46	76	1.00	0.90	1.33	1.05	96	0.68	64	29.19	4.65	1.15	79	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.171	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	487.28	234.75	80	1.00	0.90	1.33	1.05	101	0.65	66	27.14	4.49	1.13	79	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	517.28	250.04	100	1.00	0.90	1.33	1.05	126	0.63	79	29.45	4.67	1.15	96	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	517.28	250.04	100	1.00	0.90	1.33	1.05	126	0.63	79	23.40	4.11	1.10	92	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	517.28	250.04	100	1.00	0.90	1.33	1.05	126	0.63	79	23.40	4.11	1.10	92	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-34
Chainage	3+883

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish Grey, fine-grained silty sand (SM)	0.00	5.25	16.50	6.69
2	Medium Dense to Dense, Little Grey to Brownish, fine-grained silty s	5.25	10.00	19.00	9.19
3	Very Dense, Greyish, fine-grained silty sand (SM)	10.00	15.25	20.00	10.19
4	Dense, Greyish to Brownish, fine-grained silty sand (SM)	15.25	19.00	19.50	9.69
5	Very Dense, Grey Brownish to Brownish, fine-grained silty sand with Gra	19.00	30.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	5	0.75	0.90	1.33	1.05	5	1.70	8	28.20	4.58	1.14	14	0.15	1.00	0.03	0.80	1.64	1.00	0.24	0.99	0.381	0.64	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	8	0.80	0.90	1.33	1.05	8	1.70	14	36.58	0.50	1.20	17	0.18	1.00	0.15	0.80	1.36	1.00	0.24	0.98	0.375	0.65	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	10	0.85	0.90	1.33	1.05	11	1.70	18	28.69	4.61	1.14	25	0.30	1.00	0.19	0.80	1.26	1.00	0.38	0.96	0.371	1.02	Liquefiable Soil
4	5.50	7.00	6.25	105.63	44.33	20	0.95	0.90	1.33	1.05	24	1.50	36	29.21	4.65	1.15	46	NL	1.00	0.40	0.80	1.18	1.00	NL	0.95	0.354	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	134.13	58.12	28	0.95	0.90	1.33	1.05	33	1.31	44	21.16	3.80	1.09	51	NL	1.00	0.55	0.73	1.16	1.00	NL	0.94	0.339	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	162.63	71.91	34	0.95	0.90	1.33	1.05	41	1.18	48	21.16	3.80	1.09	56	NL	1.00	0.85	0.60	1.14	1.00	NL	0.93	0.328	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.88	86.45	49	1.00	0.90	1.33	1.05	62	1.08	66	23.23	4.09	1.10	77	NL	1.00	0.85	0.60	1.06	1.00	NL	0.89	0.307	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	221.88	101.74	53	1.00	0.90	1.33	1.05	67	0.99	66	23.23	4.09	1.10	77	NL	1.00	0.85	0.60	0.99	1.00	NL	0.85	0.288	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	251.88	117.03	56	1.00	0.90	1.33	1.05	70	0.92	65	24.90	4.28	1.11	77	NL	1.00	0.85	0.60	0.94	1.00	NL	0.81	0.271	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	281.88	132.32	44	1.00	0.90	1.33	1.05	55	0.87	48	23.27	4.09	1.10	57	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.255	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	311.13	146.86	27	1.00	0.90	1.33	1.05	34	0.83	28	26.58	4.44	1.13	36	NL	1.00	0.55	0.72	0.90	1.00	NL	0.73	0.240	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	340.38	161.40	46	1.00	0.90	1.33	1.05	58	0.79	46	24.60	4.25	1.11	55	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.226	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	370.00	176.32	69	1.00	0.90	1.33	1.05	87	0.75	65	26.92	4.47	1.13	78	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.212	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	400.00	191.61	62	1.00	0.90	1.33	1.05	78	0.72	56	24.62	4.25	1.11	67	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.198	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	430.00	206.90	67	1.00	0.90	1.33	1.05	84	0.70	59	28.23	4.58	1.14	71	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.184	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	460.00	222.19	75	1.00	0.90	1.33	1.05	94	0.67	63	26.21	4.41	1.12	76	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.170	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	490.00	237.48	79	1.00	0.90	1.33	1.05	99	0.65	64	30.63	4.75	1.16	79	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.157	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	520.00	252.77	87	1.00	0.90	1.33	1.05	109	0.63	69	29.36	4.66	1.15	84	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.143	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	555.00	270.61	100	1.00	0.90	1.33	1.05	126	0.61	76	28.60	4.61	1.14	92	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.128	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	575.00	280.80	100	1.00	0.90	1.33	1.05	126	0.60	75	17.68	3.17	1.06	83	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.119	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-35
Chainage	4+014

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff to Very Stiff, Little Brownish to Gey Brownish, fine-grained inorga	0.00	7.00	17.10	7.29
2	Dense, Greyish, fine-grained silty sand (SM)	7.00	13.00	19.50	9.69
3	Very Dense, Greyish, fine-grained silty sand (SM)	13.00	20.25	20.00	10.19
4	Very Dense, Grey Brownish to Little Brownish, fine-grained silty sand	20.25	30.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	5	0.75	0.90	1.33	1.05	5	1.70	8	71.05	0.50	1.20	10	0.11	1.00	0.03	0.80	1.61	1.00	0.18	0.99	0.362	0.51	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	10	0.80	0.90	1.33	1.05	10	1.70	17	71.05	0.50	1.20	21	0.23	1.00	0.18	0.80	1.33	1.00	0.30	0.98	0.357	0.85	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	11	0.85	0.90	1.33	1.05	12	1.70	20	66.68	0.50	1.20	24	0.28	1.00	0.21	0.80	1.24	1.00	0.35	0.96	0.352	0.99	Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	20	0.95	0.90	1.33	1.05	24	1.48	35	77.20	0.50	1.20	43	NL	1.00	0.40	0.80	1.17	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	134.33	58.32	32	0.95	0.90	1.33	1.05	38	1.31	50	27.91	4.55	1.14	61	NL	1.00	0.62	0.69	1.18	1.00	NL	0.94	0.338	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	163.58	72.86	39	0.95	0.90	1.33	1.05	47	1.17	55	27.91	4.55	1.14	67	NL	1.00	0.85	0.60	1.14	1.00	NL	0.93	0.325	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	192.83	87.40	39	1.00	0.90	1.33	1.05	49	1.07	52	23.73	4.15	1.11	62	NL	1.00	0.85	0.60	1.06	1.00	NL	0.89	0.305	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	222.08	101.94	43	1.00	0.90	1.33	1.05	54	0.99	54	26.33	4.42	1.13	65	NL	1.00	0.85	0.60	0.99	1.00	NL	0.85	0.288	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	251.70	116.86	57	1.00	0.90	1.33	1.05	72	0.93	66	26.77	4.46	1.13	79	NL	1.00	0.85	0.60	0.94	1.00	NL	0.81	0.271	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	281.70	132.15	68	1.00	0.90	1.33	1.05	85	0.87	74	33.34	4.90	1.18	93	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.255	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	311.70	147.44	77	1.00	0.90	1.33	1.05	97	0.82	80	19.47	3.52	1.08	89	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.240	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	341.70	162.73	100	1.00	0.90	1.33	1.05	126	0.78	99	24.23	4.21	1.11	113	NL	1.00	0.85	0.60	0.82	2.00	NL	0.69	0.225	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	371.70	178.02	100	1.00	0.90	1.33	1.05	126	0.75	94	25.65	4.35	1.12	110	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.211	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	401.70	193.31	100	1.00	0.90	1.33	1.05	126	0.72	90	20.40	3.68	1.08	102	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.197	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	431.70	208.60	100	1.00	0.90	1.33	1.05	126	0.69	87	21.09	3.79	1.09	98	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.183	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	461.70	223.89	100	1.00	0.90	1.33	1.05	126	0.67	84	69.46	0.50	1.20	101	NL	1.00	0.85	0.60	0.72	6.00	NL	0.53	0.169	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	491.70	239.18	100	1.00	0.90	1.33	1.05	126	0.65	81	20.20	3.65	1.08	91	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.156	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	521.70	254.47	100	1.00	0.90	1.33	1.05	126	0.63	79	26.63	4.45	1.13	93	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.143	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	556.70	272.31	100	1.00	0.90	1.33	1.05	126	0.61	76	19.16	3.46	1.07	85	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.127	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	576.70	282.50	100	1.00	0.90	1.33	1.05	126	0.59	75	25.16	4.31	1.12	88	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.119	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-36
Chainage	4+093

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff, Yellowish to Little Greyish, fine-grained inorganic silt of low Plas	0.00	4.00	17.10	7.29
2	Medium Dense to Dense, Little Brownish, fine-grained silty sand with	4.00	8.25	19.00	9.19
3	Very Stiff to Hard , Brownish, fine-grained inorganic silt of low Plastic	8.25	13.00	18.70	8.89
4	Dense, Greyish, fine-grained silty sand with Little Gravel (SM)	13.00	19.00	19.50	9.69
5	Very Dense, Gray Brownish, fine-grained silty sand (SM)	19.00	35.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	13	0.75	0.90	1.33	1.05	12	1.70	21	72.17	0.50	1.20	25	0.30	1.00	0.22	0.80	1.61	1.00	0.49	0.99	0.362	1.35	Non Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	17	0.80	0.90	1.33	1.05	17	1.70	29	32.11	4.83	1.17	39	NL	1.00	0.29	0.80	1.33	1.00	NL	0.98	0.357	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	82.65	36.07	22	0.85	0.90	1.33	1.05	24	1.67	39	23.44	4.11	1.10	47	NL	1.00	0.39	0.80	1.23	1.00	NL	0.96	0.344	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	111.15	49.86	31	0.95	0.90	1.33	1.05	37	1.42	52	23.44	4.11	1.10	62	NL	1.00	0.60	0.70	1.23	1.00	NL	0.95	0.331	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.65	63.65	30	0.95	0.90	1.33	1.05	36	1.25	45	17.51	3.13	1.06	51	NL	1.00	0.58	0.71	1.14	1.00	NL	0.94	0.322	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	167.85	77.14	30	0.95	0.90	1.33	1.05	36	1.14	41	17.51	3.13	1.06	46	NL	1.00	0.58	0.71	1.08	1.00	NL	0.93	0.315	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	195.90	90.48	33	1.00	0.90	1.33	1.05	41	1.05	44	66.96	0.50	1.20	53	NL	1.00	0.85	0.60	1.04	1.00	NL	0.89	0.300	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	223.95	103.82	32	1.00	0.90	1.33	1.05	40	0.98	39	78.94	0.50	1.20	48	NL	1.00	0.85	0.60	0.99	1.00	NL	0.85	0.285	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	252.60	117.76	38	1.00	0.90	1.33	1.05	48	0.92	44	27.40	4.51	1.13	54	NL	1.00	0.85	0.60	0.94	1.00	NL	0.81	0.270	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	281.85	132.30	43	1.00	0.90	1.33	1.05	54	0.87	47	24.90	4.28	1.11	57	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.255	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	311.10	146.84	48	1.00	0.90	1.33	1.05	60	0.83	50	25.40	4.33	1.12	60	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.240	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	340.35	161.38	48	1.00	0.90	1.33	1.05	60	0.79	47	22.52	4.00	1.10	56	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.226	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	369.98	176.29	55	1.00	0.90	1.33	1.05	69	0.75	52	26.93	4.47	1.13	63	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.212	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	399.98	191.58	61	1.00	0.90	1.33	1.05	77	0.72	55	24.40	4.22	1.11	66	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.198	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	429.98	206.87	68	1.00	0.90	1.33	1.05	85	0.70	59	25.23	4.31	1.12	71	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.184	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	459.98	222.16	77	1.00	0.90	1.33	1.05	97	0.67	65	30.67	4.75	1.16	80	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.170	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	489.98	237.45	100	1.00	0.90	1.33	1.05	126	0.65	82	33.05	4.88	1.18	101	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.157	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	519.98	252.74	100	1.00	0.90	1.33	1.05	126	0.63	79	27.00	4.48	1.13	94	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.143	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	554.98	270.58	100	1.00	0.90	1.33	1.05	126	0.61	76	21.31	3.83	1.09	87	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.128	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	574.98	280.78	100	1.00	0.90	1.33	1.05	126	0.60	75	30.52	4.74	1.16	92	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.119	NL	Non Liquefiable Soil
	29.50	30.50	30.00	574.98	280.78	100	1.00	0.90	1.33	1.05	126	0.60	75	30.52	4.74	1.16	92	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.119	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-37
Chainage	4+210

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff, Brownish to Whiteish, fine-grained inorganic silt of low Plasticity	0.00	4.00	17.10	7.29
2	Medium Dense, Whiteish to Brownish, fine-grained silty sand (SM)	4.00	8.25	18.00	8.19
3	Very Stiff to Hard, Yellowish, fine-grained inorganic silt of low Plastici	8.25	14.25	18.70	8.89
4	Medium Dense, Whiteish Brown to Brownish, fine-grained silty sand	14.25	20.25	18.00	8.19
5	Dense, Brownish, fine-grained silty sand with Little Gravel (SM)	20.25	29.25	19.00	9.19
6	Very Dense, Brownish, fine-grained silty sand with Little Gravel (SM)	29.25	35.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	8	0.75	0.90	1.33	1.05	8	1.70	13	80.95	0.50	1.20	16	0.17	1.00	0.13	0.80	1.61	1.00	0.27	0.99	0.362	0.75	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	15	0.80	0.90	1.33	1.05	15	1.70	26	73.05	0.50	1.20	31	NL	1.00	0.26	0.80	1.33	1.00	NL	0.98	0.357	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	81.90	35.32	23	0.85	0.90	1.33	1.05	25	1.68	41	24.80	4.27	1.11	50	NL	1.00	0.41	0.80	1.24	1.00	NL	0.96	0.349	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	108.90	47.61	18	0.95	0.90	1.33	1.05	21	1.45	31	29.17	4.65	1.15	40	NL	1.00	0.36	0.80	1.16	1.00	NL	0.95	0.340	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	135.90	59.90	28	0.95	0.90	1.33	1.05	33	1.29	43	20.49	3.70	1.08	50	NL	1.00	0.55	0.73	1.15	1.00	NL	0.94	0.333	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	163.60	72.89	30	0.95	0.90	1.33	1.05	36	1.17	42	76.09	0.50	1.20	51	NL	1.00	0.58	0.71	1.10	1.00	NL	0.93	0.325	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.65	86.23	34	1.00	0.90	1.33	1.05	43	1.08	46	68.40	0.50	1.20	56	NL	1.00	0.85	0.60	1.06	1.00	NL	0.89	0.308	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	219.70	99.57	35	1.00	0.90	1.33	1.05	44	1.00	44	68.40	0.50	1.20	53	NL	1.00	0.85	0.60	1.00	1.00	NL	0.85	0.292	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.75	112.91	30	1.00	0.90	1.33	1.05	38	0.94	35	21.90	3.91	1.09	43	NL	1.00	0.61	0.69	0.96	1.00	NL	0.81	0.276	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	275.10	125.55	22	1.00	0.90	1.33	1.05	28	0.89	25	27.93	4.56	1.14	33	NL	1.00	0.46	0.77	0.95	1.00	NL	0.77	0.262	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	302.10	137.84	19	1.00	0.90	1.33	1.05	24	0.85	20	19.10	3.45	1.07	25	0.30	1.00	0.40	0.80	0.94	1.00	0.28	0.73	0.248	1.12	Liquefiable Soil
12	17.50	19.00	18.25	329.10	150.13	31	1.00	0.90	1.33	1.05	39	0.82	32	19.10	3.45	1.07	38	NL	1.00	0.63	0.68	0.88	2.00	NL	0.69	0.235	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	356.10	162.42	28	1.00	0.90	1.33	1.05	35	0.78	28	30.84	4.76	1.16	37	NL	1.00	0.57	0.71	0.87	3.00	NL	0.65	0.221	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	384.10	175.71	34	1.00	0.90	1.33	1.05	43	0.75	32	25.00	4.29	1.12	40	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	412.60	189.50	40	1.00	0.90	1.33	1.05	50	0.73	37	22.23	3.96	1.09	44	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	441.10	203.29	32	1.00	0.90	1.33	1.05	40	0.70	28	25.55	4.34	1.12	36	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	469.60	217.08	40	1.00	0.90	1.33	1.05	50	0.68	34	20.80	3.75	1.08	41	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	498.10	230.87	49	1.00	0.90	1.33	1.05	62	0.66	41	26.72	4.45	1.13	50	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	531.35	246.96	46	1.00	0.90	1.33	1.05	58	0.64	37	26.66	4.45	1.13	46	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	555.10	258.45	56	1.00	0.90	1.33	1.05	70	0.62	44	21.50	3.85	1.09	52	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil
	31.00	32.50	31.75	583.60	272.24	63	1.00	0.90	1.33	1.05	79	0.61	48	21.70	3.88	1.09	56	NL	1.00	0.85	0.60	0.67	10.00	NL	0.33	0.109	NL	Non Liquefiable Soil
	32.50	35.00	33.75	621.60	290.63	62	1.00	0.90	1.33	1.05	78	0.59	46	22.00	3.93	1.09	54	NL	1.00	0.85	0.60	0.65	10.00	NL	0.27	0.091	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-38
Chainage	4+334

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Yellowish to Whiteish Brown, fine-grained inorga	0.00	4.00	17.10	7.29
2	Medium Dense, Brownish, fine-grained silty sand with Gravel (SM)	4.00	8.25	18.00	8.19
3	Very Stiff, Yellowish, fine-grained inorganic silt of low Plasticity with s	8.25	14.25	18.70	8.89
4	Medium Dense to Dense, Brownish to Whiteish Grey, fine-grained sil	14.25	32.25	19.00	9.19
5	Very Dense, Whiteish Grey, fine-grained silty sand (SM)	32.25	35.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	7	0.75	0.90	1.33	1.05	7	1.70	11	64.37	0.50	1.20	14	0.15	1.00	0.10	0.80	1.61	1.00	0.24	0.99	0.362	0.67	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	18	0.80	0.90	1.33	1.05	18	1.70	31	34.37	4.95	1.19	42	NL	1.00	0.31	0.80	1.33	1.00	NL	0.98	0.357	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	81.90	35.32	18	0.85	0.90	1.33	1.05	19	1.68	32	29.77	4.69	1.15	42	NL	1.00	0.32	0.80	1.23	1.00	NL	0.96	0.349	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	108.90	47.61	16	0.95	0.90	1.33	1.05	19	1.45	28	29.77	4.69	1.15	37	NL	1.00	0.32	0.80	1.16	1.00	NL	0.95	0.340	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	135.90	59.90	17	0.95	0.90	1.33	1.05	20	1.29	26	21.74	3.89	1.09	33	NL	1.00	0.34	0.80	1.11	1.00	NL	0.94	0.333	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	163.60	72.89	19	0.95	0.90	1.33	1.05	23	1.17	27	30.08	4.71	1.15	35	NL	1.00	0.38	0.80	1.07	1.00	NL	0.93	0.325	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.65	86.23	23	1.00	0.90	1.33	1.05	29	1.08	31	68.20	0.50	1.20	38	NL	1.00	0.47	0.76	1.04	1.00	NL	0.89	0.308	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	219.70	99.57	28	1.00	0.90	1.33	1.05	35	1.00	35	89.01	0.50	1.20	43	NL	1.00	0.57	0.71	1.00	1.00	NL	0.85	0.292	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.75	112.91	29	1.00	0.90	1.33	1.05	36	0.94	34	73.33	0.50	1.20	42	NL	1.00	0.59	0.70	0.96	1.00	NL	0.81	0.276	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	276.10	126.55	33	1.00	0.90	1.33	1.05	41	0.89	37	26.93	4.47	1.13	46	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.261	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	304.60	140.34	28	1.00	0.90	1.33	1.05	35	0.84	30	22.81	4.03	1.10	37	NL	1.00	0.57	0.71	0.91	1.00	NL	0.73	0.246	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	333.10	154.13	34	1.00	0.90	1.33	1.05	43	0.81	34	14.92	2.48	1.05	39	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.232	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	361.60	167.92	39	1.00	0.90	1.33	1.05	49	0.77	38	23.53	4.12	1.10	46	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.217	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.10	181.71	43	1.00	0.90	1.33	1.05	54	0.74	40	14.83	2.45	1.05	44	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	418.60	195.50	26	1.00	0.90	1.33	1.05	33	0.72	23	22.81	4.03	1.10	30	0.45	1.00	0.53	0.73	0.84	5.00	1.88	0.57	0.189	9.92	Non Liquefiable Soil
16	23.50	25.00	24.25	447.10	209.29	29	1.00	0.90	1.33	1.05	36	0.69	25	23.26	4.09	1.10	32	NL	1.00	0.59	0.70	0.80	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	475.60	223.08	34	1.00	0.90	1.33	1.05	43	0.67	29	24.81	4.27	1.11	36	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.10	236.87	38	1.00	0.90	1.33	1.05	48	0.65	31	24.71	4.26	1.11	39	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.35	252.96	43	1.00	0.90	1.33	1.05	54	0.63	34	21.60	3.87	1.09	41	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	561.10	264.45	47	1.00	0.90	1.33	1.05	59	0.61	36	24.83	4.27	1.11	45	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil
	31.00	32.50	31.75	589.60	278.24	57	1.00	0.90	1.33	1.05	72	0.60	43	20.30	3.67	1.08	50	NL	1.00	0.85	0.60	0.66	10.00	NL	0.33	0.108	NL	Non Liquefiable Soil
	32.50	35.00	33.75	629.10	298.13	57	1.00	0.90	1.33	1.05	72	0.58	41	21.60	3.87	1.09	49	NL	1.00	0.85	0.60	0.65	10.00	NL	0.27	0.090	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-39
Chainage	4+425

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Yellowish to Whiteish Brown, fine-grained inorga	0.00	4.00	17.10	7.29
2	Medium Dense, Brownish, fine-grained silty sand with Gravel (SM)	4.00	8.25	18.00	8.19
3	Very Stiff, Yellowish, fine-grained inorganic silt of low Plasticity with s	8.25	14.25	18.70	8.89
4	Medium Dense to Dense, Brownish to Whiteish Grey, fine-grained sil	14.25	32.25	19.00	9.19
5	Very Dense, Whiteish Grey, fine-grained silty sand (SM)	32.25	35.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	7	0.75	0.90	1.33	1.05	7	1.70	11	69.31	0.50	1.20	14	0.15	1.00	0.10	0.80	1.61	1.00	0.24	0.99	0.362	0.67	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	18	0.80	0.90	1.33	1.05	18	1.70	31	20.29	3.66	1.08	37	NL	1.00	0.31	0.80	1.33	1.00	NL	0.98	0.357	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	81.90	35.32	19	0.85	0.90	1.33	1.05	20	1.68	34	24.19	4.20	1.11	42	NL	1.00	0.34	0.80	1.23	1.00	NL	0.96	0.349	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	108.90	47.61	10	0.95	0.90	1.33	1.05	12	1.45	17	24.19	4.20	1.11	23	0.26	1.00	0.21	0.80	1.16	1.00	0.31	0.95	0.340	0.90	Liquefiable Soil
5	7.00	8.50	7.75	135.90	59.90	15	0.95	0.90	1.33	1.05	18	1.29	23	26.50	4.43	1.13	31	NL	1.00	0.30	0.80	1.11	1.00	NL	0.94	0.333	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	163.60	72.89	34	0.95	0.90	1.33	1.05	41	1.17	48	44.18	0.50	1.20	58	NL	1.00	0.85	0.60	1.13	1.00	NL	0.93	0.325	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.65	86.23	47	1.00	0.90	1.33	1.05	59	1.08	64	19.30	3.49	1.07	72	NL	1.00	0.85	0.60	1.06	1.00	NL	0.89	0.308	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	219.70	99.57	54	1.00	0.90	1.33	1.05	68	1.00	68	37.50	0.50	1.20	82	NL	1.00	0.85	0.60	1.00	1.00	NL	0.85	0.292	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.75	112.91	55	1.00	0.90	1.33	1.05	69	0.94	65	19.20	3.47	1.07	73	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.276	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	276.10	126.55	66	1.00	0.90	1.33	1.05	83	0.89	74	61.56	0.50	1.20	89	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.261	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	304.60	140.34	56	1.00	0.90	1.33	1.05	70	0.84	59	18.41	3.32	1.07	67	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.246	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	333.10	154.13	54	1.00	0.90	1.33	1.05	68	0.81	55	27.42	4.51	1.13	66	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.232	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	361.60	167.92	35	1.00	0.90	1.33	1.05	44	0.77	34	25.63	4.35	1.12	42	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.217	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.10	181.71	16	1.00	0.90	1.33	1.05	20	0.74	15	25.63	4.35	1.12	21	0.23	1.00	0.34	0.80	0.89	4.00	0.81	0.61	0.203	4.00	Non Liquefiable Soil
15	22.00	23.50	22.75	418.60	195.50	41	1.00	0.90	1.33	1.05	52	0.72	37	21.30	3.82	1.09	44	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	447.10	209.29	38	1.00	0.90	1.33	1.05	48	0.69	33	28.86	4.63	1.15	42	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	475.60	223.08	44	1.00	0.90	1.33	1.05	55	0.67	37	23.30	4.10	1.10	45	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.10	236.87	51	1.00	0.90	1.33	1.05	64	0.65	42	24.92	4.28	1.11	51	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.35	252.96	55	1.00	0.90	1.33	1.05	69	0.63	43	16.38	2.86	1.06	49	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	561.10	264.45	50	1.00	0.90	1.33	1.05	63	0.61	39	24.87	4.28	1.11	47	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil
	31.00	32.50	31.75	589.60	278.24	63	1.00	0.90	1.33	1.05	79	0.60	47	27.40	4.51	1.13	58	NL	1.00	0.85	0.60	0.66	10.00	NL	0.33	0.108	NL	Non Liquefiable Soil
	32.50	35.00	33.75	629.10	298.13	70	1.00	0.90	1.33	1.05	88	0.58	51	33.70	4.92	1.19	65	NL	1.00	0.85	0.60	0.65	10.00	NL	0.27	0.090	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-40
Chainage	4+518

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff, Brownish to Greyish, fine-grained inorganic silt of low P	0.00	3.25	16.40	6.59
2	Medium Dense to Dense, Greyish, fine-grained silty sand with Gravel	3.25	10.00	19.00	9.19
3	Medium Dense to Dense, Little Greyish, fine-grained silty sand (SM)	10.00	13.00	19.00	9.19
4	Very Dense, Brownish to Greyish, fine-grained silty sand with Gravel	13.00	24.25	20.00	10.19
5	Very Dense, Brownish to Greyish, fine-grained silty sand with Gravel	24.25	35.00	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.50	8.24	6	0.75	0.90	1.33	1.05	6	1.70	10	71.74	0.50	1.20	12	0.13	1.00	0.06	0.80	1.65	1.00	0.22	0.99	0.384	0.56	Liquefiable Soil
2	2.50	4.00	3.25	53.30	21.43	20	0.80	0.90	1.33	1.05	20	1.70	34	71.74	0.50	1.20	42	NL	1.00	0.34	0.80	1.36	1.00	NL	0.98	0.378	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	81.80	35.22	24	0.85	0.90	1.33	1.05	26	1.69	43	28.46	4.60	1.14	54	NL	1.00	0.42	0.79	1.25	1.00	NL	0.96	0.349	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	110.30	49.01	37	0.95	0.90	1.33	1.05	44	1.43	63	28.46	4.60	1.14	77	NL	1.00	0.85	0.60	1.33	1.00	NL	0.95	0.334	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	138.80	62.80	44	0.95	0.90	1.33	1.05	53	1.26	66	27.27	4.50	1.13	80	NL	1.00	0.85	0.60	1.20	1.00	NL	0.94	0.324	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	167.30	76.59	47	0.95	0.90	1.33	1.05	56	1.14	64	35.67	0.50	1.20	77	NL	1.00	0.85	0.60	1.11	1.00	NL	0.93	0.317	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	195.80	90.38	53	1.00	0.90	1.33	1.05	67	1.05	70	20.17	3.64	1.08	79	NL	1.00	0.85	0.60	1.04	1.00	NL	0.89	0.300	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	224.30	104.17	50	1.00	0.90	1.33	1.05	63	0.98	62	22.75	4.03	1.10	72	NL	1.00	0.85	0.60	0.98	1.00	NL	0.85	0.284	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	253.55	118.71	68	1.00	0.90	1.33	1.05	85	0.92	78	30.77	4.76	1.16	96	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.269	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	283.55	134.00	75	1.00	0.90	1.33	1.05	94	0.86	81	17.47	3.12	1.06	90	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.253	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	313.55	149.29	82	1.00	0.90	1.33	1.05	103	0.82	84	19.47	3.52	1.08	94	NL	1.00	0.85	0.60	0.85	1.00	NL	0.73	0.238	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	343.55	164.58	100	1.00	0.90	1.33	1.05	126	0.78	98	17.71	3.17	1.06	107	NL	1.00	0.85	0.60	0.82	2.00	NL	0.69	0.224	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	373.55	179.87	100	1.00	0.90	1.33	1.05	126	0.75	94	25.69	4.36	1.12	109	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.210	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	403.55	195.16	100	1.00	0.90	1.33	1.05	126	0.72	90	17.14	3.04	1.06	98	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.196	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	433.55	210.45	100	1.00	0.90	1.33	1.05	126	0.69	87	19.17	3.47	1.07	97	NL	1.00	0.85	0.60	0.74	5.00	NL	0.57	0.182	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	463.55	225.74	100	1.00	0.90	1.33	1.05	126	0.67	84	14.60	2.38	1.05	90	NL	1.00	0.85	0.60	0.72	6.00	NL	0.53	0.169	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	493.55	241.03	100	1.00	0.90	1.33	1.05	126	0.64	81	26.49	4.43	1.13	96	NL	1.00	0.85	0.60	0.70	7.00	NL	0.49	0.155	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	523.55	256.32	100	1.00	0.90	1.33	1.05	126	0.62	79	21.47	3.85	1.09	89	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.142	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	558.55	274.16	100	1.00	0.90	1.33	1.05	126	0.60	76	29.00	4.64	1.15	92	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.127	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	583.55	286.90	100	1.00	0.90	1.33	1.05	126	0.59	74	22.96	4.05	1.10	86	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.116	NL	Non Liquefiable Soil
	31.00	32.50	31.75	613.55	302.19	100	1.00	0.90	1.33	1.05	126	0.58	72	19.30	3.49	1.07	81	NL	1.00	0.85	0.60	0.64	10.00	NL	0.33	0.103	NL	Non Liquefiable Soil
	32.50	35.00	33.75	653.55	322.58	100	1.00	0.90	1.33	1.05	126	0.56	70	20.30	3.67	1.08	79	NL	1.00	0.85	0.60	0.63	10.00	NL	0.27	0.086	NL	Non Liquefiable Soil

B.6. Zone 6: CH: 4+515 km to 5+530 km (BH-41 to BH-50)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-41	0.00	2.50	6	6	10	16	0.27	0.36	0.75	Liquefiable Soil
BH-41	2.50	4.00	8	8	14	20	0.29	0.36	0.82	Liquefiable Soil
BH-42	0.00	2.50	8	8	13	16	0.27	0.34	0.79	Liquefiable Soil
BH-42	2.50	4.00	10	10	17	21	0.30	0.33	0.89	Liquefiable Soil
BH-45A	0.00	2.50	8	8	13	16	0.27	0.36	0.75	Liquefiable Soil
BH-45A	2.50	4.00	9	9	15	19	0.27	0.36	0.76	Liquefiable Soil
BH-45A	4.00	5.50	11	12	20	24	0.35	0.35	0.99	Liquefiable Soil
BH-46	0.00	2.50	8	8	13	18	0.31	0.36	0.86	Liquefiable Soil
BH-46	2.50	4.00	11	11	19	25	0.38	0.36	1.07	Liquefiable Soil
BH-49	0.00	2.50	10	9	16	21	0.37	0.36	1.02	Liquefiable Soil
BH-50	0.00	2.50	5	5	8	14	0.23	0.36	0.65	Liquefiable Soil
BH-50	2.50	4.00	9	9	15	22	0.32	0.36	0.90	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-41
Chainage	4+617

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Yellowish to Brownish, fine-grained silty sand (S	0.00	7.00	17.10	7.29
2	Dense, Brownish, fine-grained silty sand (SM)	7.00	11.25	18.53	8.72
3	Very Dense, Yellowish Brown to Brownish Grey, fine-grained silty sand (S	11.25	21.25	19.91	10.10
4	Very Dense, Brownish Grey, fine-grained silty sand with Clay and Gravel(	21.25	35.00	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	6	0.75	0.90	1.33	1.05	6	1.70	10	29.51	4.67	1.15	16	0.17	1.00	0.06	0.80	1.61	1.00	0.27	0.99	0.362	0.75	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	8	0.80	0.90	1.33	1.05	8	1.70	14	29.51	4.67	1.15	20	0.22	1.00	0.15	0.80	1.33	1.00	0.29	0.98	0.357	0.82	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	14	0.85	0.90	1.33	1.05	15	1.70	25	21.24	3.81	1.09	31	NL	1.00	0.26	0.80	1.24	1.00	NL	0.96	0.352	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	26	0.95	0.90	1.33	1.05	31	1.48	46	21.24	3.81	1.09	54	NL	1.00	0.51	0.75	1.22	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.60	57.60	31	0.95	0.90	1.33	1.05	37	1.32	49	23.20	4.08	1.10	58	NL	1.00	0.60	0.70	1.18	1.00	NL	0.94	0.340	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	161.39	70.68	41	0.95	0.90	1.33	1.05	49	1.19	58	30.50	4.74	1.16	72	NL	1.00	0.85	0.60	1.15	1.00	NL	0.93	0.331	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	189.19	83.77	48	1.00	0.90	1.33	1.05	60	1.09	66	23.14	4.08	1.10	77	NL	1.00	0.85	0.60	1.07	1.00	NL	0.89	0.313	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.36	98.23	60	1.00	0.90	1.33	1.05	75	1.01	76	24.60	4.25	1.11	89	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.294	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	248.23	113.39	59	1.00	0.90	1.33	1.05	74	0.94	70	23.03	4.06	1.10	81	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.276	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	278.09	128.54	100	1.00	0.90	1.33	1.05	126	0.88	111	22.98	4.06	1.10	126	NL	1.00	0.85	0.60	0.90	1.00	NL	0.77	0.259	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	307.96	143.70	100	1.00	0.90	1.33	1.05	126	0.83	105	23.08	4.07	1.10	119	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.243	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	337.82	158.85	100	1.00	0.90	1.33	1.05	126	0.79	100	26.20	4.41	1.12	117	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.228	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	367.69	174.01	100	1.00	0.90	1.33	1.05	126	0.76	95	25.01	4.29	1.12	111	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.213	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	397.55	189.16	100	1.00	0.90	1.33	1.05	126	0.73	91	25.30	4.32	1.12	106	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.199	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	427.42	204.32	100	1.00	0.90	1.33	1.05	126	0.70	88	26.67	4.45	1.13	104	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.185	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	457.28	219.47	100	1.00	0.90	1.33	1.05	126	0.68	85	21.14	3.80	1.09	96	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.171	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	487.15	234.63	100	1.00	0.90	1.33	1.05	126	0.65	82	19.84	3.59	1.08	92	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	517.01	249.78	100	1.00	0.90	1.33	1.05	126	0.63	80	19.70	3.56	1.08	89	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	551.86	267.46	100	1.00	0.90	1.33	1.05	126	0.61	77	28.35	4.59	1.14	92	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	576.74	280.09	100	1.00	0.90	1.33	1.05	126	0.60	75	20.57	3.71	1.08	85	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.118	NL	Non Liquefiable Soil
	31.00	32.50	31.75	606.61	295.25	100	1.00	0.90	1.33	1.05	126	0.58	73	26.90	4.47	1.13	87	NL	1.00	0.85	0.60	0.65	10.00	NL	0.33	0.105	NL	Non Liquefiable Soil
	32.50	35.00	33.75	646.43	315.45	100	1.00	0.90	1.33	1.05	126	0.56	71	26.90	4.47	1.13	84	NL	1.00	0.85	0.60	0.63	10.00	NL	0.27	0.087	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-42
Chainage	4+751

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff to Very Stiff, Brownish to Greyish, fine-grained inorganic silt of lo	0.00	5.25	18.00	8.19
2	Medium Dense, Greyish, fine-grained silty sand (SM)	5.25	10.00	18.05	8.24
3	Dense, Brownish Gray, fine-grained silty sand with Clay and Gravel(S	10.00	15.25	18.53	8.72
4	Very Dense, Greyish, fine-grained silty sand (SM)	15.25	31.00	19.91	10.10
5	Very Dense, Brownish, fine-grained silty sand (SM)	31.00	35.00	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.50	10.24	8	0.75	0.90	1.33	1.05	8	1.70	13	68.90	0.50	1.20	16	0.17	1.00	0.13	0.80	1.58	1.00	0.27	0.99	0.339	0.79	Liquefiable Soil
2	2.50	4.00	3.25	58.50	26.63	10	0.80	0.90	1.33	1.05	10	1.70	17	68.90	0.50	1.20	21	0.23	1.00	0.18	0.80	1.30	1.00	0.30	0.98	0.334	0.89	Liquefiable Soil
3	4.00	5.50	4.75	85.50	38.92	20	0.85	0.90	1.33	1.05	21	1.60	34	68.66	0.50	1.20	42	NL	1.00	0.36	0.80	1.21	1.00	NL	0.96	0.330	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	112.55	51.26	23	0.95	0.90	1.33	1.05	27	1.40	38	77.97	0.50	1.20	47	NL	1.00	0.45	0.77	1.16	1.00	NL	0.95	0.326	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.63	63.62	28	0.95	0.90	1.33	1.05	33	1.25	42	26.48	4.43	1.13	52	NL	1.00	0.55	0.73	1.13	1.00	NL	0.94	0.322	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	166.70	75.99	34	0.95	0.90	1.33	1.05	41	1.15	47	26.60	4.44	1.13	57	NL	1.00	0.85	0.60	1.12	1.00	NL	0.93	0.318	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	194.14	88.71	53	1.00	0.90	1.33	1.05	67	1.06	71	23.72	4.15	1.11	82	NL	1.00	0.85	0.60	1.05	1.00	NL	0.89	0.303	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	221.93	101.80	64	1.00	0.90	1.33	1.05	80	0.99	80	18.17	3.27	1.07	88	NL	1.00	0.85	0.60	0.99	1.00	NL	0.85	0.288	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	249.73	114.88	59	1.00	0.90	1.33	1.05	74	0.93	69	27.21	4.50	1.13	83	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.274	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	277.52	127.97	100	1.00	0.90	1.33	1.05	126	0.88	111	25.44	4.33	1.12	129	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.259	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	307.39	143.12	100	1.00	0.90	1.33	1.05	126	0.84	105	23.72	4.15	1.11	120	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.243	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	337.25	158.28	100	1.00	0.90	1.33	1.05	126	0.79	100	26.43	4.43	1.13	117	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.228	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	367.12	173.43	100	1.00	0.90	1.33	1.05	126	0.76	95	26.61	4.44	1.13	112	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.214	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	396.98	188.59	100	1.00	0.90	1.33	1.05	126	0.73	92	24.56	4.24	1.11	106	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.199	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	426.85	203.74	100	1.00	0.90	1.33	1.05	126	0.70	88	18.91	3.42	1.07	98	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.185	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	456.71	218.90	100	1.00	0.90	1.33	1.05	126	0.68	85	26.44	4.43	1.13	100	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.171	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	486.58	234.05	100	1.00	0.90	1.33	1.05	126	0.65	82	19.67	3.56	1.08	92	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	516.44	249.21	100	1.00	0.90	1.33	1.05	126	0.63	80	29.78	4.69	1.15	96	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	551.28	266.89	100	1.00	0.90	1.33	1.05	126	0.61	77	18.65	3.37	1.07	86	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	576.17	279.52	100	1.00	0.90	1.33	1.05	126	0.60	75	29.65	4.68	1.15	91	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.118	NL	Non Liquefiable Soil
	31.00	32.50	31.75	606.04	294.67	100	1.00	0.90	1.33	1.05	126	0.58	73	19.99	3.61	1.08	83	NL	1.00	0.85	0.60	0.65	10.00	NL	0.33	0.105	NL	Non Liquefiable Soil
	32.50	35.00	33.75	645.86	314.88	100	1.00	0.90	1.33	1.05	126	0.56	71	20.00	3.61	1.08	80	NL	1.00	0.85	0.60	0.63	10.00	NL	0.27	0.087	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-43
Chainage	4+833

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff to Very Stiff, Brownish to Greyish, fine-grained inorganic silt of lo	0.00	5.25	18.00	8.19
2	Medium Dense to Dense, Greyish to Grey Brownish, fine-grained silty	5.25	9.25	18.05	8.24
3	Very Dense, Greyish to Brownish Grey, fine-grained silty sand (SM)	9.25	18.25	19.91	10.10
4	Very Dense, Grey Brownish, fine-grained silty sand (SM)	18.25	27.25	19.91	10.10
5	Very Dense, Greyish, fine-grained silty sand (SM)	27.25	35	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.50	10.24	12	0.75	0.90	1.33	1.05	11	1.70	19	76.35	0.50	1.20	24	0.27	1.00	0.20	0.80	1.58	1.00	0.42	0.99	0.339	1.24	Non Liquefiable Soil
2	2.50	4.00	3.25	58.50	26.63	19	0.80	0.90	1.33	1.05	19	1.70	32	76.35	0.50	1.20	39	NL	1.00	0.32	0.80	1.30	1.00	NL	0.98	0.334	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	85.50	38.92	25	0.85	0.90	1.33	1.05	27	1.60	43	66.06	0.50	1.20	52	NL	1.00	0.44	0.78	1.23	1.00	NL	0.96	0.330	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	112.55	51.26	32	0.95	0.90	1.33	1.05	38	1.40	53	25.83	4.37	1.12	64	NL	1.00	0.62	0.69	1.23	1.00	NL	0.95	0.326	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.63	63.62	48	0.95	0.90	1.33	1.05	57	1.25	72	32.49	4.85	1.18	89	NL	1.00	0.85	0.60	1.20	1.00	NL	0.94	0.322	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	166.70	75.99	52	0.95	0.90	1.33	1.05	62	1.15	71	25.01	4.29	1.12	84	NL	1.00	0.85	0.60	1.12	1.00	NL	0.93	0.318	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	196.57	91.14	67	1.00	0.90	1.33	1.05	84	1.05	88	25.01	4.29	1.12	103	NL	1.00	0.85	0.60	1.04	1.00	NL	0.89	0.298	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	226.43	106.30	72	1.00	0.90	1.33	1.05	90	0.97	88	27.36	4.51	1.13	104	NL	1.00	0.85	0.60	0.98	1.00	NL	0.85	0.281	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	256.30	121.45	80	1.00	0.90	1.33	1.05	101	0.91	91	22.96	4.05	1.10	104	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.266	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	286.16	136.61	100	1.00	0.90	1.33	1.05	126	0.86	108	29.62	4.68	1.15	128	NL	1.00	0.85	0.60	0.88	1.00	NL	0.77	0.251	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	316.03	151.76	100	1.00	0.90	1.33	1.05	126	0.81	102	30.77	4.76	1.16	123	NL	1.00	0.85	0.60	0.85	1.00	NL	0.73	0.236	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	345.89	166.92	100	1.00	0.90	1.33	1.05	126	0.77	97	28.82	4.62	1.14	116	NL	1.00	0.85	0.60	0.81	2.00	NL	0.69	0.222	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	375.76	182.07	100	1.00	0.90	1.33	1.05	126	0.74	93	31.25	4.78	1.16	113	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.208	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	405.62	197.23	100	1.00	0.90	1.33	1.05	126	0.71	89	16.80	2.96	1.06	98	NL	1.00	0.85	0.60	0.76	4.00	NL	0.61	0.195	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	435.49	212.38	100	1.00	0.90	1.33	1.05	126	0.69	86	18.85	3.41	1.07	96	NL	1.00	0.85	0.60	0.74	5.00	NL	0.57	0.181	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	465.35	227.54	100	1.00	0.90	1.33	1.05	126	0.66	83	20.17	3.64	1.08	94	NL	1.00	0.85	0.60	0.72	6.00	NL	0.53	0.168	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	495.22	242.69	100	1.00	0.90	1.33	1.05	126	0.64	81	20.80	3.75	1.08	91	NL	1.00	0.85	0.60	0.70	7.00	NL	0.49	0.155	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	525.08	257.85	100	1.00	0.90	1.33	1.05	126	0.62	78	23.35	4.10	1.10	90	NL	1.00	0.85	0.60	0.68	8.00	NL	0.45	0.142	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	559.92	275.53	100	1.00	0.90	1.33	1.05	126	0.60	76	23.64	4.14	1.10	88	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.127	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	584.81	288.16	100	1.00	0.90	1.33	1.05	126	0.59	74	23.89	4.17	1.11	86	NL	1.00	0.85	0.60	0.65	10.00	NL	0.37	0.116	NL	Non Liquefiable Soil
	31.00	32.50	31.75	614.68	303.31	100	1.00	0.90	1.33	1.05	126	0.57	72	28.10	4.57	1.14	87	NL	1.00	0.85	0.60	0.64	10.00	NL	0.33	0.103	NL	Non Liquefiable Soil
	32.50	35.00	33.75	654.50	323.52	100	1.00	0.90	1.33	1.05	126	0.56	70	22.22	3.96	1.09	80	NL	1.00	0.85	0.60	0.63	10.00	NL	0.27	0.086	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-44
Chainage	4+910

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff to Very Stiff, Brownish to Greyish, fine-grained inorganic silt of lo	0.00	5.25	18.00	8.19
2	Medium Dense to Dense, Greyish to Grey Brownish, fine-grained silty	5.25	9.25	18.05	8.24
3	Very Dense, Greyish to Brownish Grey, fine-grained silty sand (SM)	9.25	18.25	19.91	10.10
4	Very Dense, Grey Brownish, fine-grained silty sand (SM)	18.25	27.25	19.91	10.10
5	Very Dense, Greyish, fine-grained silty sand (SM)	27.25	35	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.50	10.24	17	0.75	0.90	1.33	1.05	16	1.70	27	19.82	3.58	1.08	33	NL	1.00	0.27	0.80	1.58	1.00	NL	0.99	0.339	NL	Non Liquefiable Soil
2	2.50	4.00	3.25	58.50	26.63	43	0.80	0.90	1.33	1.05	43	1.70	74	28.13	4.57	1.14	88	NL	1.00	0.85	0.60	1.70	1.00	NL	0.98	0.334	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	85.50	38.92	50	0.85	0.90	1.33	1.05	53	1.60	86	22.40	3.98	1.10	98	NL	1.00	0.85	0.60	1.46	1.00	NL	0.96	0.330	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	112.55	51.26	37	0.95	0.90	1.33	1.05	44	1.40	62	32.13	4.84	1.17	77	NL	1.00	0.85	0.60	1.31	1.00	NL	0.95	0.326	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.63	63.62	53	0.95	0.90	1.33	1.05	63	1.25	79	29.55	4.68	1.15	96	NL	1.00	0.85	0.60	1.20	1.00	NL	0.94	0.322	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	166.70	75.99	40	0.95	0.90	1.33	1.05	48	1.15	55	33.07	4.89	1.18	70	NL	1.00	0.85	0.60	1.12	1.00	NL	0.93	0.318	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	196.57	91.14	60	1.00	0.90	1.33	1.05	75	1.05	79	22.12	3.94	1.09	90	NL	1.00	0.85	0.60	1.04	1.00	NL	0.89	0.298	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	226.43	106.30	53	1.00	0.90	1.33	1.05	67	0.97	65	18.78	3.39	1.07	73	NL	1.00	0.85	0.60	0.98	1.00	NL	0.85	0.281	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	256.30	121.45	55	1.00	0.90	1.33	1.05	69	0.91	63	29.77	4.69	1.15	77	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.266	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	286.16	136.61	66	1.00	0.90	1.33	1.05	83	0.86	71	27.43	4.52	1.13	85	NL	1.00	0.85	0.60	0.88	1.00	NL	0.77	0.251	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	316.03	151.76	75	1.00	0.90	1.33	1.05	94	0.81	77	27.42	4.51	1.13	91	NL	1.00	0.85	0.60	0.85	1.00	NL	0.73	0.236	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	345.89	166.92	100	1.00	0.90	1.33	1.05	126	0.77	97	28.94	4.63	1.15	116	NL	1.00	0.85	0.60	0.81	2.00	NL	0.69	0.222	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	375.76	182.07	75	1.00	0.90	1.33	1.05	94	0.74	70	23.48	4.12	1.10	81	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.208	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	405.62	197.23	100	1.00	0.90	1.33	1.05	126	0.71	89	28.82	4.62	1.14	107	NL	1.00	0.85	0.60	0.76	4.00	NL	0.61	0.195	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	435.49	212.38	100	1.00	0.90	1.33	1.05	126	0.69	86	28.36	4.59	1.14	103	NL	1.00	0.85	0.60	0.74	5.00	NL	0.57	0.181	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	465.35	227.54	100	1.00	0.90	1.33	1.05	126	0.66	83	29.42	4.67	1.15	100	NL	1.00	0.85	0.60	0.72	6.00	NL	0.53	0.168	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	495.22	242.69	100	1.00	0.90	1.33	1.05	126	0.64	81	21.60	3.87	1.09	92	NL	1.00	0.85	0.60	0.70	7.00	NL	0.49	0.155	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	525.08	257.85	100	1.00	0.90	1.33	1.05	126	0.62	78	20.93	3.77	1.09	89	NL	1.00	0.85	0.60	0.68	8.00	NL	0.45	0.142	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	559.92	275.53	100	1.00	0.90	1.33	1.05	126	0.60	76	20.19	3.65	1.08	85	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.127	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	584.81	288.16	100	1.00	0.90	1.33	1.05	126	0.59	74	19.06	3.45	1.07	83	NL	1.00	0.85	0.60	0.65	10.00	NL	0.37	0.116	NL	Non Liquefiable Soil
	31.00	32.50	31.75	614.68	303.31	100	1.00	0.90	1.33	1.05	126	0.57	72	22.77	4.03	1.10	83	NL	1.00	0.85	0.60	0.64	10.00	NL	0.33	0.103	NL	Non Liquefiable Soil
	32.50	35.00	33.75	654.50	323.52	100	1.00	0.90	1.33	1.05	126	0.56	70	32.00	4.83	1.17	87	NL	1.00	0.85	0.60	0.63	10.00	NL	0.27	0.086	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-45
Chainage	5+030

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense ,Brownish Grey, fine-grained silty sand (SM	0.00	7.00	17.10	7.29
2	Dense, Whiteish to Brownish, fine-grained silty sand with Gravel (SM	7.00	14.25	18.00	8.19
3	Very Dense, Brownish to Whiteish, fine-grained silty sand with Grave	14.25	24.25	19.91	10.10
4	Hard, Yellowish to Brownish, fine-grained inorganic silt of low Plasticit	24.25	29.25	19.70	9.89
5	Very Dense, Brownish to Yellowish, fine-grained silty sand with Grave	29.25	35.00	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	12	0.75	0.90	1.33	1.05	11	1.70	19	22.42	3.98	1.10	25	0.29	1.00	0.20	0.80	1.61	1.00	0.47	0.99	0.362	1.31	Non Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	15	0.80	0.90	1.33	1.05	15	1.70	26	30.23	4.72	1.16	34	NL	1.00	0.26	0.80	1.33	1.00	NL	0.98	0.357	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	19	0.85	0.90	1.33	1.05	20	1.70	34	22.88	4.04	1.10	42	NL	1.00	0.34	0.80	1.24	1.00	NL	0.96	0.352	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	29	0.95	0.90	1.33	1.05	35	1.48	51	30.42	4.73	1.16	64	NL	1.00	0.57	0.72	1.25	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.20	57.20	33	0.95	0.90	1.33	1.05	39	1.32	52	30.23	4.72	1.16	65	NL	1.00	0.64	0.68	1.20	1.00	NL	0.94	0.342	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	160.20	69.49	45	0.95	0.90	1.33	1.05	54	1.20	64	21.44	3.84	1.09	74	NL	1.00	0.85	0.60	1.16	1.00	NL	0.93	0.334	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.20	81.78	46	1.00	0.90	1.33	1.05	58	1.11	64	21.49	3.85	1.09	74	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.317	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	214.20	94.07	49	1.00	0.90	1.33	1.05	62	1.03	63	25.57	4.35	1.12	75	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.301	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.20	106.36	48	1.00	0.90	1.33	1.05	60	0.97	58	27.04	4.48	1.13	71	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	270.11	120.56	76	1.00	0.90	1.33	1.05	96	0.91	87	21.57	3.86	1.09	99	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	299.98	135.71	53	1.00	0.90	1.33	1.05	67	0.86	57	28.36	4.59	1.14	70	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	329.84	150.87	57	1.00	0.90	1.33	1.05	72	0.81	58	30.64	4.75	1.16	72	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	359.71	166.02	59	1.00	0.90	1.33	1.05	74	0.78	58	30.32	4.73	1.16	71	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.219	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.57	181.18	66	1.00	0.90	1.33	1.05	83	0.74	62	28.47	4.60	1.14	75	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	419.44	196.33	73	1.00	0.90	1.33	1.05	92	0.71	65	30.24	4.72	1.16	80	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	449.30	211.49	86	1.00	0.90	1.33	1.05	108	0.69	74	67.52	0.50	1.20	90	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	478.85	226.33	92	1.00	0.90	1.33	1.05	116	0.66	77	72.18	0.50	1.20	93	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.161	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	508.40	241.17	100	1.00	0.90	1.33	1.05	126	0.64	81	75.98	0.50	1.20	98	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	542.88	258.48	100	1.00	0.90	1.33	1.05	126	0.62	78	32.26	4.84	1.17	97	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	567.71	271.06	100	1.00	0.90	1.33	1.05	126	0.61	76	29.60	4.68	1.15	93	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil
	31.00	32.50	31.75	597.58	286.21	100	1.00	0.90	1.33	1.05	126	0.59	74	29.32	4.66	1.15	90	NL	1.00	0.85	0.60	0.66	10.00	NL	0.33	0.106	NL	Non Liquefiable Soil
	32.50	35.00	33.75	637.40	306.42	100	1.00	0.90	1.33	1.05	126	0.57	72	27.42	4.51	1.13	86	NL	1.00	0.85	0.60	0.64	10.00	NL	0.27	0.089	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-45A
Chainage	5+080

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish to Greyish, fine-grained silty sand	0.00	11.25	17.10	7.29
2	Dense to Very Dense, Brownish Grey to Greyish, fine-grained silty sa	11.25	20.25	18.00	8.19
3	Hard, Yellowish Brown, fine-grained inorganic silt of low Plasticity wit	20.25	26.25	19.70	9.89
4	Very Dense, Brownish to Greyish, fine-grained silty sand (SM)	26.25	35	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	8	0.75	0.90	1.33	1.05	8	1.70	13	75.24	0.50	1.20	16	0.17	1.00	0.13	0.80	1.61	1.00	0.27	0.99	0.362	0.75	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	9	0.80	0.90	1.33	1.05	9	1.70	15	52.88	0.50	1.20	19	0.20	1.00	0.17	0.80	1.33	1.00	0.27	0.98	0.357	0.76	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	11	0.85	0.90	1.33	1.05	12	1.70	20	36.93	0.50	1.20	24	0.28	1.00	0.21	0.80	1.24	1.00	0.35	0.96	0.352	0.99	Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	13	0.95	0.90	1.33	1.05	16	1.48	23	48.90	0.50	1.20	28	0.37	1.00	0.27	0.80	1.17	1.00	0.44	0.95	0.348	1.25	Non Liquefiable Soil
5	7.00	8.50	7.75	132.53	56.52	18	0.95	0.90	1.33	1.05	21	1.33	29	38.17	0.50	1.20	35	NL	1.00	0.36	0.80	1.12	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.18	67.46	24	0.95	0.90	1.33	1.05	29	1.22	35	40.25	0.50	1.20	42	NL	1.00	0.47	0.76	1.10	1.00	NL	0.93	0.340	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	183.83	78.40	28	1.00	0.90	1.33	1.05	35	1.13	40	46.31	0.50	1.20	48	NL	1.00	0.57	0.71	1.07	1.00	NL	0.89	0.324	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	210.38	90.24	32	1.00	0.90	1.33	1.05	40	1.05	42	35.00	0.50	1.20	51	NL	1.00	0.85	0.60	1.04	1.00	NL	0.85	0.308	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	237.38	102.53	37	1.00	0.90	1.33	1.05	47	0.99	46	37.29	0.50	1.20	56	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.291	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	264.38	114.82	44	1.00	0.90	1.33	1.05	55	0.93	52	26.91	4.47	1.13	63	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.275	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	291.38	127.11	55	1.00	0.90	1.33	1.05	69	0.89	61	29.57	4.68	1.15	75	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.260	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	318.38	139.40	58	1.00	0.90	1.33	1.05	73	0.85	62	34.75	4.97	1.19	79	NL	1.00	0.85	0.60	0.88	2.00	NL	0.69	0.245	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	345.38	151.69	66	1.00	0.90	1.33	1.05	83	0.81	67	72.33	0.50	1.20	81	NL	1.00	0.85	0.60	0.85	3.00	NL	0.65	0.230	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	374.08	165.68	37	1.00	0.90	1.33	1.05	47	0.78	36	54.59	0.50	1.20	44	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.214	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	403.63	180.52	43	1.00	0.90	1.33	1.05	54	0.74	40	50.02	0.50	1.20	49	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.198	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	433.18	195.36	75	1.00	0.90	1.33	1.05	94	0.72	67	86.23	0.50	1.20	81	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.182	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	462.73	210.20	81	1.00	0.90	1.33	1.05	102	0.69	70	47.48	0.50	1.20	85	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.167	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	492.49	225.25	100	1.00	0.90	1.33	1.05	126	0.67	84	27.68	4.54	1.14	100	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.152	NL	Non Liquefiable Soil
19	28.50	30.00	29.25	532.31	245.46	100	1.00	0.90	1.33	1.05	126	0.64	80	48.14	0.50	1.20	97	NL	1.00	0.85	0.60	0.70	9.00	NL	0.39	0.133	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-46
Chainage	5+122

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense , Whiteish Grey to Dark Brownish, fine-grain	0.00	11.25	17.10	7.29
2	Dense , Dark Brownish to Grey Brownish, fine-grained silty sand (SM	11.25	15.25	18.00	8.19
3	Very Dense , Greyish, fine-grained silty sand (SM)	15.25	24.25	19.91	10.10
4	Very Dense , Brownish Grey, fine-grained silty sand (SM)	24.25	35.00	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	8	0.75	0.90	1.33	1.05	8	1.70	13	23.01	4.06	1.10	18	0.19	1.00	0.13	0.80	1.61	1.00	0.31	0.99	0.362	0.86	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	11	0.80	0.90	1.33	1.05	11	1.70	19	23.01	4.06	1.10	25	0.29	1.00	0.20	0.80	1.33	1.00	0.38	0.98	0.357	1.07	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	16	0.85	0.90	1.33	1.05	17	1.70	29	17.94	3.22	1.07	34	NL	1.00	0.29	0.80	1.24	1.00	NL	0.96	0.352	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	17	0.95	0.90	1.33	1.05	20	1.48	30	17.87	3.21	1.07	35	NL	1.00	0.34	0.80	1.17	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.53	56.52	20	0.95	0.90	1.33	1.05	24	1.33	32	22.72	4.02	1.10	39	NL	1.00	0.40	0.80	1.12	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.18	67.46	27	0.95	0.90	1.33	1.05	32	1.22	39	20.20	3.65	1.08	46	NL	1.00	0.53	0.74	1.11	1.00	NL	0.93	0.340	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	183.83	78.40	29	1.00	0.90	1.33	1.05	36	1.13	41	30.46	4.74	1.16	52	NL	1.00	0.59	0.70	1.07	1.00	NL	0.89	0.324	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	210.38	90.24	34	1.00	0.90	1.33	1.05	43	1.05	45	24.81	4.27	1.11	54	NL	1.00	0.85	0.60	1.04	1.00	NL	0.85	0.308	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	237.38	102.53	42	1.00	0.90	1.33	1.05	53	0.99	52	23.01	4.06	1.10	61	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.291	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	264.38	114.82	53	1.00	0.90	1.33	1.05	67	0.93	62	30.44	4.73	1.16	77	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.275	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	294.24	129.98	61	1.00	0.90	1.33	1.05	77	0.88	67	25.00	4.29	1.12	79	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.257	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	324.11	145.13	66	1.00	0.90	1.33	1.05	83	0.83	69	20.53	3.70	1.08	78	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.239	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	353.97	160.29	70	1.00	0.90	1.33	1.05	88	0.79	69	18.87	3.41	1.07	78	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	383.84	175.44	71	1.00	0.90	1.33	1.05	89	0.75	67	28.46	4.60	1.14	82	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	413.70	190.60	76	1.00	0.90	1.33	1.05	96	0.72	69	20.46	3.69	1.08	79	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	443.57	205.75	90	1.00	0.90	1.33	1.05	113	0.70	79	22.42	3.98	1.10	90	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	473.43	220.91	99	1.00	0.90	1.33	1.05	124	0.67	84	31.20	4.78	1.16	102	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	503.30	236.06	100	1.00	0.90	1.33	1.05	126	0.65	82	27.07	4.48	1.13	97	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	538.14	253.74	100	1.00	0.90	1.33	1.05	126	0.63	79	23.48	4.12	1.10	91	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	563.03	266.37	100	1.00	0.90	1.33	1.05	126	0.61	77	28.07	4.57	1.14	92	NL	1.00	0.85	0.60	0.68	9.00	NL	0.37	0.121	NL	Non Liquefiable Soil
	31.00	32.50	31.75	592.89	281.53	100	1.00	0.90	1.33	1.05	126	0.60	75	18.10	3.25	1.07	83	NL	1.00	0.85	0.60	0.66	9.00	NL	0.33	0.107	NL	Non Liquefiable Soil
	32.50	35.00	33.75	632.71	301.74	100	1.00	0.90	1.33	1.05	126	0.58	72	21.31	3.83	1.09	83	NL	1.00	0.85	0.60	0.64	9.00	NL	0.27	0.089	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-48
Chainage	5+393

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Greyish, fine-grained silty sand (SM)	0.00	9.25	18.05	8.24
2	Dense to Very Dense, Greyish, fine-grained silty sand with Gravel (SM	9.25	16.00	18.00	8.19
3	Very Dense, Greyish, fine-grained silty sand with Gravel (SM)	16.00	35.00	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.56	10.30	18	0.75	0.90	1.33	1.05	17	1.70	29	20.01	3.62	1.08	35	NL	1.00	0.29	0.80	1.58	1.00	NL	0.99	0.338	NL	Non Liquefiable Soil
2	2.50	4.00	3.25	58.66	26.79	23	0.80	0.90	1.33	1.05	23	1.70	39	27.93	4.56	1.14	49	NL	1.00	0.38	0.80	1.30	1.00	NL	0.98	0.333	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	85.74	39.16	18	0.85	0.90	1.33	1.05	19	1.60	31	18.74	3.38	1.07	36	NL	1.00	0.32	0.80	1.21	1.00	NL	0.96	0.329	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	112.81	51.52	30	0.95	0.90	1.33	1.05	36	1.39	50	18.74	3.38	1.07	57	NL	1.00	0.58	0.71	1.21	1.00	NL	0.95	0.325	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.89	63.89	26	0.95	0.90	1.33	1.05	31	1.25	39	23.28	4.09	1.10	47	NL	1.00	0.51	0.75	1.12	1.00	NL	0.94	0.321	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	166.96	76.25	35	0.95	0.90	1.33	1.05	42	1.15	48	23.28	4.09	1.10	57	NL	1.00	0.85	0.60	1.11	1.00	NL	0.93	0.317	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	193.96	88.54	77	1.00	0.90	1.33	1.05	97	1.06	103	32.79	4.87	1.18	126	NL	1.00	0.85	0.60	1.05	1.00	NL	0.89	0.303	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	220.96	100.83	25	1.00	0.90	1.33	1.05	31	1.00	31	27.62	4.53	1.14	40	NL	1.00	0.51	0.74	1.00	1.00	NL	0.85	0.290	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.96	113.12	64	1.00	0.90	1.33	1.05	80	0.94	76	19.83	3.59	1.08	85	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.276	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	274.96	125.41	55	1.00	0.90	1.33	1.05	69	0.89	62	19.85	3.59	1.08	70	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.262	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	303.40	139.13	88	1.00	0.90	1.33	1.05	111	0.85	94	28.09	4.57	1.14	111	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.247	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	333.26	154.29	88	1.00	0.90	1.33	1.05	111	0.81	89	28.18	4.58	1.14	106	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.231	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	363.13	169.44	100	1.00	0.90	1.33	1.05	126	0.77	97	22.72	4.02	1.10	110	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.216	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	392.99	184.60	100	1.00	0.90	1.33	1.05	126	0.74	93	23.81	4.16	1.11	106	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.201	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	422.86	199.75	100	1.00	0.90	1.33	1.05	126	0.71	89	30.00	4.71	1.15	107	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.187	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	452.72	214.91	100	1.00	0.90	1.33	1.05	126	0.68	86	29.37	4.66	1.15	103	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	482.59	230.06	100	1.00	0.90	1.33	1.05	126	0.66	83	21.23	3.81	1.09	94	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.159	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	512.45	245.22	100	1.00	0.90	1.33	1.05	126	0.64	80	28.34	4.59	1.14	96	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	547.29	262.90	100	1.00	0.90	1.33	1.05	126	0.62	78	20.37	3.68	1.08	88	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	572.18	275.53	100	1.00	0.90	1.33	1.05	126	0.60	76	29.46	4.67	1.15	92	NL	1.00	0.85	0.60	0.67	9.00	NL	0.37	0.119	NL	Non Liquefiable Soil
	31.00	32.50	31.75	602.05	290.68	100	1.00	0.90	1.33	1.05	126	0.59	74	32.21	4.84	1.17	91	NL	1.00	0.85	0.60	0.65	9.00	NL	0.33	0.105	NL	Non Liquefiable Soil
	32.50	35.00	33.75	641.87	310.89	100	1.00	0.90	1.33	1.05	126	0.57	71	32.21	4.84	1.17	88	NL	1.00	0.85	0.60	0.64	9.00	NL	0.27	0.088	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-49
Chainage	5+442

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Greyish to Gray Brownish, fine-grained silty	0.00	7.00	17.10	7.29
2	Dense, Brownish Grey to Grey, fine-grained silty sand (SM)	7.00	15.25	18.53	8.72
3	Very Dense, Grey to Brownish, fine-grained silty sand with Gravel (SI	15.25	24.25	18.10	8.29
4	Hard, Brownish, fine-grained inorganic silt of low Plasticity with Grave	24.25	29.25	19.70	9.89
5	Very Dense, Brownish, fine-grained silty sand with Gravel (SM)	29.25	35.00	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	10	0.75	0.90	1.33	1.05	9	1.70	16	20.71	3.73	1.08	21	0.23	1.00	0.17	0.80	1.61	1.00	0.37	0.99	0.362	1.02	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	15	0.80	0.90	1.33	1.05	15	1.70	26	20.71	3.73	1.08	32	NL	1.00	0.26	0.80	1.33	1.00	NL	0.98	0.357	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	16	0.85	0.90	1.33	1.05	17	1.70	29	23.92	4.17	1.11	36	NL	1.00	0.29	0.80	1.24	1.00	NL	0.96	0.352	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	27	0.95	0.90	1.33	1.05	32	1.48	48	17.86	3.20	1.07	54	NL	1.00	0.53	0.74	1.23	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.60	57.60	33	0.95	0.90	1.33	1.05	39	1.32	52	33.62	4.91	1.18	66	NL	1.00	0.64	0.68	1.19	1.00	NL	0.94	0.340	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	161.39	70.68	49	0.95	0.90	1.33	1.05	59	1.19	70	33.62	4.91	1.18	87	NL	1.00	0.85	0.60	1.15	1.00	NL	0.93	0.331	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	189.19	83.77	48	1.00	0.90	1.33	1.05	60	1.09	66	21.57	3.86	1.09	76	NL	1.00	0.85	0.60	1.07	1.00	NL	0.89	0.313	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	216.98	96.85	26	1.00	0.90	1.33	1.05	33	1.02	33	20.00	3.61	1.08	39	NL	1.00	0.53	0.73	1.01	1.00	NL	0.85	0.296	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.78	109.94	32	1.00	0.90	1.33	1.05	40	0.95	38	24.38	4.22	1.11	47	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.280	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	272.57	123.02	53	1.00	0.90	1.33	1.05	67	0.90	60	19.44	3.52	1.08	68	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.265	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	299.72	135.46	45	1.00	0.90	1.33	1.05	57	0.86	49	31.15	4.78	1.16	61	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	326.87	147.90	77	1.00	0.90	1.33	1.05	97	0.82	80	19.82	3.58	1.08	89	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.237	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	354.02	160.34	78	1.00	0.90	1.33	1.05	98	0.79	77	25.62	4.35	1.12	91	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	381.17	172.78	100	1.00	0.90	1.33	1.05	126	0.76	96	28.13	4.57	1.14	113	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.209	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	408.32	185.22	100	1.00	0.90	1.33	1.05	126	0.73	92	19.51	3.53	1.08	103	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.195	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	435.47	197.66	100	1.00	0.90	1.33	1.05	126	0.71	89	29.25	4.65	1.15	107	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.181	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	465.02	212.50	100	1.00	0.90	1.33	1.05	126	0.69	86	68.75	0.50	1.20	104	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.166	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	494.57	227.34	100	1.00	0.90	1.33	1.05	126	0.66	83	69.91	0.50	1.20	101	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.152	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	529.05	244.65	100	1.00	0.90	1.33	1.05	126	0.64	80	71.69	0.50	1.20	97	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.135	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	553.88	257.23	100	1.00	0.90	1.33	1.05	126	0.62	78	28.79	4.62	1.14	94	NL	1.00	0.85	0.60	0.69	9.00	NL	0.37	0.123	NL	Non Liquefiable Soil
	31.00	32.50	31.75	583.75	272.39	100	1.00	0.90	1.33	1.05	126	0.61	76	22.12	3.94	1.09	87	NL	1.00	0.85	0.60	0.67	9.00	NL	0.33	0.109	NL	Non Liquefiable Soil
	32.50	35.00	33.75	623.57	292.59	100	1.00	0.90	1.33	1.05	126	0.58	73	22.12	3.94	1.09	84	NL	1.00	0.85	0.60	0.65	9.00	NL	0.27	0.091	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-50
Chainage	5+532

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish Grey to to Whiteish Grey, fine-gra	0.00	8.25	17.10	7.29
2	Dense, Whiteish Brown to Brownish, fine-grained silty sand with Grav	8.25	13.00	18.00	8.19
3	Very Dense, Brownish, fine-grained silty sand with Gravel (SM)	13.00	17.25	19.91	10.10
4	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with Grave	17.25	28.00	19.70	9.89
5	Very Dense, Brownish, fine-grained silty sand with Gravel (SM)	28.00	35.00	19.91	10.10

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (C_N)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	5	0.75	0.90	1.33	1.05	5	1.70	8	26.81	4.46	1.13	14	0.15	1.00	0.03	0.80	1.61	1.00	0.23	0.99	0.362	0.65	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	9	0.80	0.90	1.33	1.05	9	1.70	15	26.81	4.46	1.13	22	0.24	1.00	0.17	0.80	1.33	1.00	0.32	0.98	0.357	0.90	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	14	0.85	0.90	1.33	1.05	15	1.70	25	19.09	3.45	1.07	31	NL	1.00	0.26	0.80	1.24	1.00	NL	0.96	0.352	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	16	0.95	0.90	1.33	1.05	19	1.48	28	19.09	3.45	1.07	34	NL	1.00	0.32	0.80	1.17	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.53	56.52	22	0.95	0.90	1.33	1.05	26	1.33	35	20.49	3.70	1.08	42	NL	1.00	0.43	0.78	1.13	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.08	68.36	32	0.95	0.90	1.33	1.05	38	1.21	46	30.32	4.73	1.16	58	NL	1.00	0.62	0.69	1.13	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.08	80.65	38	1.00	0.90	1.33	1.05	48	1.11	53	22.13	3.94	1.09	62	NL	1.00	0.85	0.60	1.09	1.00	NL	0.89	0.319	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	213.08	92.94	30	1.00	0.90	1.33	1.05	38	1.04	39	21.85	3.90	1.09	47	NL	1.00	0.61	0.69	1.02	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.51	106.67	100	1.00	0.90	1.33	1.05	126	0.97	122	19.32	3.49	1.07	134	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.37	121.82	100	1.00	0.90	1.33	1.05	126	0.91	114	21.63	3.87	1.09	128	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.266	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	301.24	136.98	100	1.00	0.90	1.33	1.05	126	0.85	107	26.32	4.42	1.13	125	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.249	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.89	151.92	68	1.00	0.90	1.33	1.05	85	0.81	69	74.78	0.50	1.20	84	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.44	166.76	75	1.00	0.90	1.33	1.05	94	0.77	73	71.43	0.50	1.20	88	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.99	181.60	100	1.00	0.90	1.33	1.05	126	0.74	93	71.72	0.50	1.20	112	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	419.54	196.44	100	1.00	0.90	1.33	1.05	126	0.71	90	72.92	0.50	1.20	108	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	449.09	211.28	100	1.00	0.90	1.33	1.05	126	0.69	86	72.28	0.50	1.20	104	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	478.64	226.12	100	1.00	0.90	1.33	1.05	126	0.67	84	67.00	0.50	1.20	101	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.161	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	508.19	240.96	100	1.00	0.90	1.33	1.05	126	0.64	81	71.69	0.50	1.20	98	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	542.88	258.48	100	1.00	0.90	1.33	1.05	126	0.62	78	20.95	3.77	1.09	89	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	567.77	271.11	100	1.00	0.90	1.33	1.05	126	0.61	76	21.49	3.85	1.09	87	NL	1.00	0.85	0.60	0.67	9.00	NL	0.37	0.120	NL	Non Liquefiable Soil
	31.00	32.50	31.75	597.63	286.27	100	1.00	0.90	1.33	1.05	126	0.59	74	19.64	3.55	1.08	84	NL	1.00	0.85	0.60	0.66	9.00	NL	0.33	0.106	NL	Non Liquefiable Soil
	32.50	35.00	33.75	637.45	306.48	100	1.00	0.90	1.33	1.05	126	0.57	72	19.64	3.55	1.08	81	NL	1.00	0.85	0.60	0.64	9.00	NL	0.27	0.089	NL	Non Liquefiable Soil

B.7. Zone 7: CH: 5+530 km to 6+490 km (BH-51 to BH-60)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-51	0.00	2.50	9	8	14	18	0.31	0.37	0.83	Liquefiable Soil
BH-51	2.50	4.00	11	11	19	23	0.35	0.37	0.95	Liquefiable Soil
BH-52	0.00	2.50	9	8	14	20	0.33	0.33	0.99	Liquefiable Soil
BH-53	0.00	2.50	9	8	14	19	0.33	0.33	0.98	Liquefiable Soil
BH-55	0.00	2.50	8	8	13	18	0.33	0.43	0.76	Liquefiable Soil
BH-55	2.50	4.00	9	9	15	21	0.32	0.42	0.75	Liquefiable Soil
BH-56	0.00	2.50	8	8	13	19	0.36	0.43	0.83	Liquefiable Soil
BH-56	2.50	4.00	8	8	14	20	0.30	0.42	0.70	Liquefiable Soil
BH-56	4.00	5.50	10	11	18	22	0.32	0.42	0.77	Liquefiable Soil
BH-57	0.00	2.50	10	9	16	22	0.39	0.33	1.15	Liquefiable Soil
BH-58	0.00	2.50	10	9	16	20	0.35	0.37	0.93	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-51
Chainage	5+596

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff , Brownish, fine-grained inorganic silt of low Plasticity with sand an	0.00	4.00	16.75	6.94
2	Loose to Medium Dense, Greyish to Gray Brownish, fine-grained silty sa	4.00	11.25	18.25	8.44
3	Dense, Brownish to Gray Brownish, fine-grained silty sand (SM)	11.25	21.25	18.93	9.12
4	Hard , Gray to Brownish Gray, fine-grained inorganic silt of low Plasticit	21.25	26.25	19.70	9.89
5	Very Dense, Gray to Brownish Gray, fine-grained silty sand (SM)	26.25	30.00	20.50	10.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.94	8.68	9	0.75	0.90	1.33	1.05	8	1.70	14	71.05	0.50	1.20	18	0.19	1.00	0.16	0.80	1.63	1.00	0.31	0.99	0.373	0.83	Liquefiable Soil
2	2.50	4.00	3.25	54.44	22.57	11	0.80	0.90	1.33	1.05	11	1.70	19	65.52	0.50	1.20	23	0.26	1.00	0.20	0.80	1.35	1.00	0.35	0.98	0.367	0.95	Liquefiable Soil
3	4.00	5.50	4.75	80.69	34.11	12	0.85	0.90	1.33	1.05	13	1.70	22	28.90	4.63	1.15	30	0.44	1.00	0.22	0.80	1.24	1.00	0.55	0.96	0.356	1.54	Non Liquefiable Soil
4	5.50	7.00	6.25	108.06	46.77	16	0.95	0.90	1.33	1.05	19	1.46	28	24.21	4.20	1.11	35	NL	1.00	0.32	0.80	1.16	1.00	NL	0.95	0.343	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	135.44	59.44	20	0.95	0.90	1.33	1.05	24	1.30	31	29.11	4.64	1.15	40	NL	1.00	0.40	0.80	1.11	1.00	NL	0.94	0.334	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	162.81	72.10	22	0.95	0.90	1.33	1.05	26	1.18	31	27.34	4.51	1.13	40	NL	1.00	0.43	0.78	1.07	1.00	NL	0.93	0.327	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	190.19	84.77	24	1.00	0.90	1.33	1.05	30	1.09	33	24.34	4.22	1.11	41	NL	1.00	0.49	0.75	1.04	1.00	NL	0.89	0.310	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.24	98.11	32	1.00	0.90	1.33	1.05	40	1.01	41	29.27	4.66	1.15	51	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.294	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	246.64	111.80	38	1.00	0.90	1.33	1.05	48	0.95	45	40.60	0.50	1.20	55	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.278	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	275.03	125.48	44	1.00	0.90	1.33	1.05	55	0.89	49	22.31	3.97	1.10	58	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.262	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	303.43	139.17	47	1.00	0.90	1.33	1.05	59	0.85	50	28.03	4.56	1.14	62	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.247	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	331.82	152.85	54	1.00	0.90	1.33	1.05	68	0.81	55	33.15	4.89	1.18	70	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.22	166.54	60	1.00	0.90	1.33	1.05	75	0.77	58	15.78	2.71	1.05	64	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	388.61	180.22	64	1.00	0.90	1.33	1.05	80	0.74	60	75.89	0.50	1.20	72	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.204	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	418.16	195.06	67	1.00	0.90	1.33	1.05	84	0.72	60	57.58	0.50	1.20	73	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	447.71	209.90	80	1.00	0.90	1.33	1.05	101	0.69	69	67.92	0.50	1.20	84	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	477.26	224.74	79	1.00	0.90	1.33	1.05	99	0.67	66	23.70	4.14	1.11	77	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.161	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	507.61	240.38	100	1.00	0.90	1.33	1.05	126	0.64	81	26.31	4.42	1.12	96	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	543.49	259.09	100	1.00	0.90	1.33	1.05	126	0.62	78	29.70	4.69	1.15	95	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	569.11	272.46	100	1.00	0.90	1.33	1.05	126	0.61	76	17.26	3.07	1.06	84	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.119	NL	Non Liquefiable Soil
	31.00	32.50	31.75	599.86	288.50	100	1.00	0.90	1.33	1.05	126	0.59	74	29.30	4.66	1.15	90	NL	1.00	0.85	0.60	0.65	10.00	NL	0.33	0.106	NL	Non Liquefiable Soil
	32.50	35.00	33.75	640.86	309.89	100	1.00	0.90	1.33	1.05	126	0.57	71	29.30	4.66	1.15	87	NL	1.00	0.85	0.60	0.64	10.00	NL	0.27	0.088	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-52
Chainage	5+718

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Whitish grey to Brownish Gray, fine-grained sil	0.00	7.00	18.25	8.44
2	Very Stiff, Brownish to Yellowish, fine-grained inorganic silt of low Plasti	7.00	13.00	18.70	8.89
3	Very Dense, Brownish Gray, fine-grained silty sand (SM)	13.00	20.25	20.50	10.69
4	Very Dense, Yellowish Brown to Brownish Grey, fine-grained silty sand (	20.25	25.00	20.50	10.69
5	Very Dense, Yellowish to Brownish, fine-grained silty sand (SM)	25.00	35.00	20.50	10.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.81	10.55	9	0.75	0.90	1.33	1.05	8	1.70	14	21.95	3.92	1.09	20	0.21	1.00	0.16	0.80	1.57	1.00	0.33	0.99	0.334	0.99	Liquefiable Soil
2	2.50	4.00	3.25	59.31	27.44	13	0.80	0.90	1.33	1.05	13	1.70	22	20.96	3.77	1.09	28	0.37	1.00	0.23	0.80	1.30	1.00	0.47	0.98	0.329	1.44	Non Liquefiable Soil
3	4.00	5.50	4.75	86.69	40.11	19	0.85	0.90	1.33	1.05	20	1.58	32	70.00	0.50	1.20	39	NL	1.00	0.34	0.80	1.20	1.00	NL	0.96	0.325	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	114.06	52.77	23	0.95	0.90	1.33	1.05	27	1.38	38	20.92	3.77	1.09	45	NL	1.00	0.45	0.77	1.16	1.00	NL	0.95	0.321	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	141.78	65.77	31	0.95	0.90	1.33	1.05	37	1.23	46	29.87	4.70	1.15	57	NL	1.00	0.60	0.70	1.13	1.00	NL	0.94	0.316	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	169.83	79.11	38	0.95	0.90	1.33	1.05	45	1.12	51	75.27	0.50	1.20	62	NL	1.00	0.85	0.60	1.10	1.00	NL	0.93	0.311	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	197.88	92.45	21	1.00	0.90	1.33	1.05	26	1.04	27	25.43	4.33	1.12	35	NL	1.00	0.44	0.78	1.02	1.00	NL	0.89	0.296	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	225.93	105.79	34	1.00	0.90	1.33	1.05	43	0.97	42	72.80	0.50	1.20	50	NL	1.00	0.85	0.60	0.98	1.00	NL	0.85	0.282	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	255.33	120.48	45	1.00	0.90	1.33	1.05	57	0.91	52	69.04	0.50	1.20	62	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.267	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	286.08	136.52	74	1.00	0.90	1.33	1.05	93	0.86	80	33.05	4.88	1.18	99	NL	1.00	0.85	0.60	0.88	1.00	NL	0.77	0.251	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	316.83	152.56	100	1.00	0.90	1.33	1.05	126	0.81	102	39.32	0.50	1.20	123	NL	1.00	0.85	0.60	0.84	1.00	NL	0.73	0.235	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	347.58	168.60	100	1.00	0.90	1.33	1.05	126	0.77	97	27.83	4.55	1.14	115	NL	1.00	0.85	0.60	0.81	2.00	NL	0.69	0.221	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	378.33	184.64	63	1.00	0.90	1.33	1.05	79	0.74	58	55.80	0.50	1.20	70	NL	1.00	0.85	0.60	0.78	3.00	NL	0.65	0.207	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	409.08	200.68	100	1.00	0.90	1.33	1.05	126	0.71	89	26.46	4.43	1.13	104	NL	1.00	0.85	0.60	0.76	4.00	NL	0.61	0.193	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	439.83	216.72	100	1.00	0.90	1.33	1.05	126	0.68	85	18.14	3.26	1.07	94	NL	1.00	0.85	0.60	0.73	5.00	NL	0.57	0.179	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	470.58	232.76	100	1.00	0.90	1.33	1.05	126	0.66	82	18.58	3.35	1.07	92	NL	1.00	0.85	0.60	0.71	6.00	NL	0.53	0.166	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	501.33	248.80	100	1.00	0.90	1.33	1.05	126	0.63	80	26.58	4.44	1.13	94	NL	1.00	0.85	0.60	0.69	7.00	NL	0.49	0.153	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	532.08	264.84	100	1.00	0.90	1.33	1.05	126	0.61	77	30.16	4.72	1.16	94	NL	1.00	0.85	0.60	0.68	8.00	NL	0.45	0.140	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	567.95	283.56	100	1.00	0.90	1.33	1.05	126	0.59	75	23.64	4.14	1.10	87	NL	1.00	0.85	0.60	0.66	9.00	NL	0.40	0.125	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	593.58	296.92	100	1.00	0.90	1.33	1.05	126	0.58	73	21.08	3.79	1.09	83	NL	1.00	0.85	0.60	0.65	10.00	NL	0.37	0.114	NL	Non Liquefiable Soil
	31.00	32.50	31.75	624.33	312.96	100	1.00	0.90	1.33	1.05	126	0.57	71	15.75	2.70	1.05	77	NL	1.00	0.85	0.60	0.63	10.00	NL	0.33	0.102	NL	Non Liquefiable Soil
	32.50	35.00	33.75	665.33	334.35	100	1.00	0.90	1.33	1.05	126	0.55	69	31.39	4.79	1.17	85	NL	1.00	0.85	0.60	0.62	10.00	NL	0.27	0.085	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-53
Chainage	5+830

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense , Brownish, fine-grained inorganic silt of low Plasticity w	0.00	4.00	18.35	8.54
2	Stiff to Very Stiff, Whitish Brown to Brownish Grey, fine-grained silty sa	4.00	8.25	18.50	8.69
3	Medium Dense, Brownish, fine-grained silty sand with Gravel (SM)	8.25	12.25	18.35	8.54
4	Dense, Yellowish to Brownish, fine-grained silty sand with Gravel (SM)	12.25	17.25	18.93	9.12
5	Hard , Brownish, fine-grained inorganic silt of low Plasticity with sand (f	17.25	20.25	19.70	9.89
6	Very Dense, Brownish to Brownish Grey, fine-grained silty sand with Gra	20.25	29.25	20.50	10.69
7	Very Dense, Yellowish to Brownish, fine-grained silty sand with Gravel (	29.25	35.00	20.5	10.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.94	10.68	9	0.75	0.90	1.33	1.05	8	1.70	14	21.11	3.79	1.09	19	0.21	1.00	0.16	0.80	1.56	1.00	0.33	0.99	0.332	0.98	Liquefiable Soil
2	2.50	4.00	3.25	59.64	27.77	13	0.80	0.90	1.33	1.05	13	1.70	22	19.81	3.58	1.08	28	0.35	1.00	0.23	0.80	1.29	1.00	0.46	0.98	0.327	1.40	Non Liquefiable Soil
3	4.00	5.50	4.75	87.28	40.69	16	0.85	0.90	1.33	1.05	17	1.57	27	10.78	1.13	1.03	29	0.39	1.00	0.29	0.80	1.20	1.00	0.47	0.96	0.322	1.46	Non Liquefiable Soil
4	5.50	7.00	6.25	115.03	53.73	18	0.95	0.90	1.33	1.05	21	1.36	29	67.55	0.50	1.20	36	NL	1.00	0.36	0.80	1.13	1.00	NL	0.95	0.318	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	142.78	66.77	21	0.95	0.90	1.33	1.05	25	1.22	31	67.27	0.50	1.20	37	NL	1.00	0.41	0.79	1.09	1.00	NL	0.94	0.314	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	170.38	79.66	24	0.95	0.90	1.33	1.05	29	1.12	32	69.07	0.50	1.20	39	NL	1.00	0.47	0.76	1.05	1.00	NL	0.93	0.310	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	197.90	92.48	28	1.00	0.90	1.33	1.05	35	1.04	37	23.84	4.16	1.11	45	NL	1.00	0.57	0.71	1.02	1.00	NL	0.89	0.296	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	225.43	105.29	30	1.00	0.90	1.33	1.05	38	0.97	37	24.05	4.19	1.11	45	NL	1.00	0.61	0.69	0.98	1.00	NL	0.85	0.283	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	253.82	118.98	36	1.00	0.90	1.33	1.05	45	0.92	41	27.12	4.49	1.13	51	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.269	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	282.22	132.66	42	1.00	0.90	1.33	1.05	53	0.87	46	22.12	3.94	1.09	54	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.254	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	310.61	146.35	48	1.00	0.90	1.33	1.05	60	0.83	50	23.28	4.09	1.10	59	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.241	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	339.78	160.80	50	1.00	0.90	1.33	1.05	63	0.79	50	23.90	4.17	1.11	59	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.226	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	369.33	175.64	53	1.00	0.90	1.33	1.05	67	0.75	50	62.40	0.50	1.20	61	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.212	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	398.88	190.48	52	1.00	0.90	1.33	1.05	65	0.72	47	76.00	0.50	1.20	57	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.198	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	428.43	205.32	58	1.00	0.90	1.33	1.05	73	0.70	51	41.04	0.50	1.20	62	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.184	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	457.98	220.16	69	1.00	0.90	1.33	1.05	87	0.67	58	20.56	3.71	1.08	67	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.171	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	487.53	235.00	100	1.00	0.90	1.33	1.05	126	0.65	82	64.50	0.50	1.20	99	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.157	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	517.08	249.84	100	1.00	0.90	1.33	1.05	126	0.63	80	18.88	3.41	1.07	89	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	551.55	267.16	100	1.00	0.90	1.33	1.05	126	0.61	77	31.29	4.79	1.17	94	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	576.18	279.52	100	1.00	0.90	1.33	1.05	126	0.60	75	26.82	4.46	1.13	89	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.118	NL	Non Liquefiable Soil
	31.00	32.50	31.75	605.73	294.36	100	1.00	0.90	1.33	1.05	126	0.58	73	21.70	3.88	1.09	84	NL	1.00	0.85	0.60	0.65	10.00	NL	0.33	0.105	NL	Non Liquefiable Soil
	32.50	35.00	33.75	645.13	314.15	100	1.00	0.90	1.33	1.05	126	0.56	71	24.83	4.27	1.11	83	NL	1.00	0.85	0.60	0.63	10.00	NL	0.27	0.087	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-54
Chainage	5+939

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Brownish to Grey, fine-grained silty sand (SM)	0.00	12.25	18.35	8.54
2	Dense, Little Grey, fine-grained silty sand (SM)	12.25	16.00	18.93	9.12
3	Very Dense, Brownish Grey to Brownish, fine-grained silty sand (SM)	16.00	30.00	20.50	10.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.94	10.68	12	0.75	0.90	1.33	1.05	11	1.70	19	30.40	4.73	1.16	27	0.35	1.00	0.20	0.80	1.56	1.00	0.54	0.99	0.332	1.63	Non Liquefiable Soil
2	2.50	4.00	3.25	59.64	27.77	16	0.80	0.90	1.33	1.05	16	1.70	27	22.30	3.97	1.10	34	NL	1.00	0.27	0.80	1.29	1.00	NL	0.98	0.327	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	87.16	40.58	17	0.85	0.90	1.33	1.05	18	1.57	29	19.00	3.43	1.07	34	NL	1.00	0.31	0.80	1.20	1.00	NL	0.96	0.323	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	114.69	53.40	20	0.95	0.90	1.33	1.05	24	1.37	33	19.56	3.54	1.08	39	NL	1.00	0.40	0.80	1.13	1.00	NL	0.95	0.319	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	142.21	66.21	22	0.95	0.90	1.33	1.05	26	1.23	32	19.30	3.49	1.07	38	NL	1.00	0.43	0.78	1.09	1.00	NL	0.94	0.315	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	169.74	79.03	21	0.95	0.90	1.33	1.05	25	1.12	28	24.80	4.27	1.11	36	NL	1.00	0.41	0.79	1.05	1.00	NL	0.93	0.311	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	197.26	91.84	27	1.00	0.90	1.33	1.05	34	1.04	35	26.72	4.45	1.13	44	NL	1.00	0.55	0.72	1.02	1.00	NL	0.89	0.297	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	224.79	104.66	29	1.00	0.90	1.33	1.05	36	0.98	36	21.00	3.78	1.09	42	NL	1.00	0.59	0.70	0.99	1.00	NL	0.85	0.284	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	253.18	118.34	34	1.00	0.90	1.33	1.05	43	0.92	39	26.88	4.47	1.13	49	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.269	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	281.58	132.03	44	1.00	0.90	1.33	1.05	55	0.87	48	28.00	4.56	1.14	59	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.255	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	311.15	146.89	53	1.00	0.90	1.33	1.05	67	0.83	55	30.04	4.71	1.15	68	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.240	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	341.90	162.93	55	1.00	0.90	1.33	1.05	69	0.78	54	24.07	4.19	1.11	64	NL	1.00	0.85	0.60	0.82	2.00	NL	0.69	0.225	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	372.65	178.97	59	1.00	0.90	1.33	1.05	74	0.75	55	28.26	4.58	1.14	68	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.210	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	403.40	195.01	65	1.00	0.90	1.33	1.05	82	0.72	59	26.32	4.42	1.13	70	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.196	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	434.15	211.05	73	1.00	0.90	1.33	1.05	92	0.69	63	25.95	4.38	1.12	75	NL	1.00	0.85	0.60	0.74	5.00	NL	0.57	0.182	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	464.90	227.09	100	1.00	0.90	1.33	1.05	126	0.66	83	28.14	4.57	1.14	100	NL	1.00	0.85	0.60	0.72	6.00	NL	0.53	0.168	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	495.65	243.13	100	1.00	0.90	1.33	1.05	126	0.64	81	27.84	4.55	1.14	96	NL	1.00	0.85	0.60	0.70	7.00	NL	0.49	0.155	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	526.40	259.17	100	1.00	0.90	1.33	1.05	126	0.62	78	28.00	4.56	1.14	93	NL	1.00	0.85	0.60	0.68	8.00	NL	0.45	0.141	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	562.28	277.88	100	1.00	0.90	1.33	1.05	126	0.60	75	27.89	4.55	1.14	90	NL	1.00	0.85	0.60	0.66	9.00	NL	0.40	0.126	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	582.78	288.58	100	1.00	0.90	1.33	1.05	126	0.59	74	27.89	4.55	1.14	89	NL	1.00	0.85	0.60	0.65	10.00	NL	0.37	0.115	NL	Non Liquefiable Soil
	31.00	32.50	31.75	582.78	288.58	100	1.00	0.90	1.33	1.05	126	0.59	74	27.89	4.55	1.14	89	NL	1.00	0.85	0.60	0.65	10.00	NL	0.33	0.103	NL	Non Liquefiable Soil
	32.50	35.00	33.75	582.78	288.58	100	1.00	0.90	1.33	1.05	126	0.59	74	27.89	4.55	1.14	89	NL	1.00	0.85	0.60	0.65	10.00	NL	0.27	0.086	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-55
Chainage	6+004

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose ,Grey to Grey Brownish , fine-grained silty sand (SM)	0.00	4.00	15.30	5.49
2	Medium Dense, Grey to Grey Brownish , fine-grained silty sand (SM)	4.00	10.00	18.35	8.54
3	Dense, Brownish Grey, fine-grained silty sand (SM)	10.00	14.25	18.93	9.12
4	Very Dense, Brownish to Brownish Grey, fine-grained silty sand (SM)	14.25	30.00	20.50	10.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	19.13	6.87	8	0.75	0.90	1.33	1.05	8	1.70	13	21.72	3.89	1.09	18	0.19	1.00	0.13	0.80	1.71	1.00	0.33	0.99	0.430	0.76	Liquefiable Soil
2	2.50	4.00	3.25	49.73	17.85	9	0.80	0.90	1.33	1.05	9	1.70	15	21.72	3.89	1.09	21	0.22	1.00	0.17	0.80	1.41	1.00	0.32	0.98	0.424	0.75	Liquefiable Soil
3	4.00	5.50	4.75	74.96	28.38	13	0.85	0.90	1.33	1.05	14	1.70	24	33.05	4.88	1.18	33	NL	1.00	0.24	0.80	1.29	1.00	NL	0.96	0.397	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	102.49	41.20	16	0.95	0.90	1.33	1.05	19	1.56	30	22.13	3.94	1.09	37	NL	1.00	0.32	0.80	1.19	1.00	NL	0.95	0.370	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	130.01	54.01	22	0.95	0.90	1.33	1.05	26	1.36	36	19.68	3.56	1.08	42	NL	1.00	0.43	0.78	1.14	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.54	66.83	28	0.95	0.90	1.33	1.05	33	1.22	41	26.70	4.45	1.13	51	NL	1.00	0.55	0.73	1.12	1.00	NL	0.93	0.342	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.50	80.08	33	1.00	0.90	1.33	1.05	41	1.12	46	28.90	4.63	1.15	58	NL	1.00	0.85	0.60	1.09	1.00	NL	0.89	0.321	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	213.89	93.76	41	1.00	0.90	1.33	1.05	52	1.03	53	32.50	4.86	1.18	67	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.301	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	242.29	107.45	49	1.00	0.90	1.33	1.05	62	0.96	59	20.17	3.64	1.08	68	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.284	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	272.25	122.70	54	1.00	0.90	1.33	1.05	68	0.90	61	28.95	4.63	1.15	75	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.265	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	303.00	138.74	60	1.00	0.90	1.33	1.05	75	0.85	64	26.30	4.42	1.12	76	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.248	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	333.75	154.78	65	1.00	0.90	1.33	1.05	82	0.80	66	23.46	4.12	1.10	77	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.231	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	364.50	170.82	69	1.00	0.90	1.33	1.05	87	0.77	66	33.33	4.90	1.18	83	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.215	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	395.25	186.86	69	1.00	0.90	1.33	1.05	87	0.73	63	29.82	4.69	1.15	78	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	426.00	202.90	75	1.00	0.90	1.33	1.05	94	0.70	66	23.38	4.11	1.10	77	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.186	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	456.75	218.94	83	1.00	0.90	1.33	1.05	104	0.68	71	28.58	4.61	1.14	85	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.171	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	487.50	234.98	90	1.00	0.90	1.33	1.05	113	0.65	74	24.80	4.27	1.11	86	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.157	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	518.25	251.02	100	1.00	0.90	1.33	1.05	126	0.63	79	31.32	4.79	1.17	97	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	554.13	269.73	100	1.00	0.90	1.33	1.05	126	0.61	77	20.96	3.77	1.09	87	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.128	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	574.63	280.43	100	1.00	0.90	1.33	1.05	126	0.60	75	37.70	0.50	1.20	91	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.117	NL	Non Liquefiable Soil
	31.00	32.50	31.75	574.63	280.43	100	1.00	0.90	1.33	1.05	126	0.60	75	37.70	0.50	1.20	91	NL	1.00	0.85	0.60	0.66	10.00	NL	0.33	0.104	NL	Non Liquefiable Soil
	32.50	35.00	33.75	574.63	280.43	100	1.00	0.90	1.33	1.05	126	0.60	75	37.70	0.50	1.20	91	NL	1.00	0.85	0.60	0.66	10.00	NL	0.27	0.087	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-56
Chainage	6+182

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish Grey to Yellowish Brown , fine-grained silty sand (SM)	0.00	6.25	15.30	5.49
2	Stiff to Very Stiff, Whiteish Grey, fine-grained inorganic silt of low Plastic	6.25	10.00	18.50	8.69
3	Medium Dense to Dense ,Yellowish to Brownish , fine-grained silty sand	10.00	18.25	18.93	9.12
4	Hard, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity	18.25	23.25	19.70	9.89
5	Very Dense, Yellowish to Brownish, fine-grained silty sand (SM)	23.25	27.25	20.50	10.69
6	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand (N	27.25	30.00	19.70	9.89

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	19.13	6.87	8	0.75	0.90	1.33	1.05	8	1.70	13	29.84	4.70	1.15	19	0.21	1.00	0.13	0.80	1.71	1.00	0.36	0.99	0.430	0.83	Liquefiable Soil
2	2.50	4.00	3.25	49.73	17.85	8	0.80	0.90	1.33	1.05	8	1.70	14	25.71	4.36	1.12	20	0.21	1.00	0.15	0.80	1.41	1.00	0.30	0.98	0.424	0.70	Liquefiable Soil
3	4.00	5.50	4.75	72.68	26.09	10	0.85	0.90	1.33	1.05	11	1.70	18	57.86	0.50	1.20	22	0.25	1.00	0.19	0.80	1.31	1.00	0.32	0.96	0.419	0.77	Liquefiable Soil
4	5.50	7.00	6.25	95.63	34.33	15	0.95	0.90	1.33	1.05	18	1.70	30	17.04	3.02	1.06	35	NL	1.00	0.30	0.80	1.24	1.00	NL	0.95	0.414	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	123.38	47.37	17	0.95	0.90	1.33	1.05	20	1.45	29	17.04	3.02	1.06	34	NL	1.00	0.34	0.80	1.16	1.00	NL	0.94	0.382	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	151.13	60.41	25	0.95	0.90	1.33	1.05	30	1.29	38	54.28	0.50	1.20	47	NL	1.00	0.49	0.76	1.13	1.00	NL	0.93	0.363	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	179.20	73.78	29	1.00	0.90	1.33	1.05	36	1.16	42	18.84	3.40	1.07	49	NL	1.00	0.59	0.70	1.09	1.00	NL	0.89	0.336	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	207.59	87.46	32	1.00	0.90	1.33	1.05	40	1.07	43	37.62	0.50	1.20	52	NL	1.00	0.85	0.60	1.06	1.00	NL	0.85	0.314	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	235.99	101.15	35	1.00	0.90	1.33	1.05	44	0.99	44	80.19	0.50	1.20	53	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.294	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	264.38	114.83	45	1.00	0.90	1.33	1.05	57	0.93	53	45.98	0.50	1.20	64	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.275	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	292.78	128.52	48	1.00	0.90	1.33	1.05	60	0.88	53	27.72	4.54	1.14	65	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.258	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	321.17	142.20	65	1.00	0.90	1.33	1.05	82	0.84	69	45.92	0.50	1.20	83	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.242	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	350.72	157.04	69	1.00	0.90	1.33	1.05	87	0.80	69	85.89	0.50	1.20	84	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.225	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	380.27	171.88	60	1.00	0.90	1.33	1.05	75	0.76	58	78.74	0.50	1.20	70	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.209	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	409.82	186.72	64	1.00	0.90	1.33	1.05	80	0.73	59	89.05	0.50	1.20	71	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.194	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	440.17	202.36	67	1.00	0.90	1.33	1.05	84	0.70	59	42.26	0.50	1.20	72	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	470.92	218.40	66	1.00	0.90	1.33	1.05	83	0.68	56	51.38	0.50	1.20	68	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	501.67	234.44	80	1.00	0.90	1.33	1.05	101	0.65	66	42.54	0.50	1.20	79	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	537.55	253.15	95	1.00	0.90	1.33	1.05	119	0.63	75	64.24	0.50	1.20	91	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	563.17	266.52	100	1.00	0.90	1.33	1.05	126	0.61	77	76.68	0.50	1.20	93	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-57
Chainage	6+246

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish Gray, fine-grained silty sand	0.00	4.00	18.25	8.44
2	Medium Dense to Dense, Greyish to Brown, fine-grained silty sa	4.00	12.25	18.93	9.12
3	Very Dense, Brownish Grey to Yellowish Brown, fine-grained silt	12.25	22.00	20.50	10.69
4	Very Dense, Dark Brownish to Yellowish Brown, fine-grained silt	22.00	35.00	20.50	10.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.81	10.55	10	0.75	0.90	1.33	1.05	9	1.70	16	25.44	4.33	1.12	22	0.25	1.00	0.17	0.80	1.57	1.00	0.39	0.99	0.334	1.15	Liquefiable Soil
2	2.50	4.00	3.25	59.31	27.44	17	0.80	0.90	1.33	1.05	17	1.70	29	27.54	4.52	1.13	37	NL	1.00	0.29	0.80	1.30	1.00	NL	0.98	0.329	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	87.20	40.62	63	0.85	0.90	1.33	1.05	67	1.57	106	30.44	4.73	1.16	127	NL	1.00	0.85	0.60	1.43	1.00	NL	0.96	0.323	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	115.59	54.30	34	0.95	0.90	1.33	1.05	41	1.36	55	19.06	3.45	1.07	63	NL	1.00	0.85	0.60	1.28	1.00	NL	0.95	0.316	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	143.99	67.99	18	0.95	0.90	1.33	1.05	21	1.21	26	27.26	4.50	1.13	34	NL	1.00	0.36	0.80	1.08	1.00	NL	0.94	0.311	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	172.38	81.67	29	0.95	0.90	1.33	1.05	35	1.11	38	21.98	3.92	1.09	46	NL	1.00	0.57	0.72	1.06	1.00	NL	0.93	0.306	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	200.78	95.36	44	1.00	0.90	1.33	1.05	55	1.02	57	16.20	2.82	1.06	63	NL	1.00	0.85	0.60	1.02	1.00	NL	0.89	0.291	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	229.17	109.04	73	1.00	0.90	1.33	1.05	92	0.96	88	26.40	4.43	1.13	103	NL	1.00	0.85	0.60	0.97	1.00	NL	0.85	0.278	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	259.92	125.08	100	1.00	0.90	1.33	1.05	126	0.89	112	26.44	4.43	1.13	131	NL	1.00	0.85	0.60	0.91	1.00	NL	0.81	0.262	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	290.67	141.12	100	1.00	0.90	1.33	1.05	126	0.84	106	23.77	4.15	1.11	121	NL	1.00	0.85	0.60	0.87	1.00	NL	0.77	0.246	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	321.42	157.16	100	1.00	0.90	1.33	1.05	126	0.80	100	35.52	0.50	1.20	121	NL	1.00	0.85	0.60	0.83	1.00	NL	0.73	0.232	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	352.17	173.20	100	1.00	0.90	1.33	1.05	126	0.76	96	19.83	3.59	1.08	107	NL	1.00	0.85	0.60	0.80	2.00	NL	0.69	0.218	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	382.92	189.24	100	1.00	0.90	1.33	1.05	126	0.73	91	40.76	0.50	1.20	110	NL	1.00	0.85	0.60	0.77	3.00	NL	0.65	0.204	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	413.67	205.28	100	1.00	0.90	1.33	1.05	126	0.70	88	30.40	4.73	1.16	106	NL	1.00	0.85	0.60	0.75	4.00	NL	0.61	0.191	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	444.42	221.32	100	1.00	0.90	1.33	1.05	126	0.67	84	27.36	4.51	1.13	100	NL	1.00	0.85	0.60	0.73	5.00	NL	0.57	0.177	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	475.17	237.36	100	1.00	0.90	1.33	1.05	126	0.65	82	18.64	3.36	1.07	91	NL	1.00	0.85	0.60	0.71	6.00	NL	0.53	0.164	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	505.92	253.40	100	1.00	0.90	1.33	1.05	126	0.63	79	33.16	4.89	1.18	98	NL	1.00	0.85	0.60	0.69	7.00	NL	0.49	0.152	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	536.67	269.44	100	1.00	0.90	1.33	1.05	126	0.61	77	32.48	4.85	1.18	95	NL	1.00	0.85	0.60	0.67	8.00	NL	0.45	0.139	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	572.55	288.15	100	1.00	0.90	1.33	1.05	126	0.59	74	29.79	4.69	1.15	90	NL	1.00	0.85	0.60	0.65	9.00	NL	0.40	0.124	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	598.17	301.52	100	1.00	0.90	1.33	1.05	126	0.58	72	26.11	4.40	1.12	86	NL	1.00	0.85	0.60	0.64	10.00	NL	0.37	0.113	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-58
Chainage	6+323

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, fine-grained inorganic silt of low Plasticity with sar	0.00	4.00	16.75	6.94
2	Medium Dense to Dense, fine-grained silty sand (SM)	4.00	8.25	18.93	9.12
3	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand (M	8.25	14.25	19.70	9.89
4	Dense to Very Dense, Greyish fine-grained silty sand (SM)	14.25	20.25	20.50	10.69
5	Hard, Brownish Grey, fine-grained inorganic silt of low Plasticity with sa	20.25	26.25	19.70	9.89
6	Very Dense, Gray to Brownish Grey, fine-grained silty sand (SM)	26.25	35.00	20.50	10.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.94	8.68	10	0.75	0.90	1.33	1.05	9	1.70	16	73.83	0.50	1.20	20	0.21	1.00	0.17	0.80	1.63	1.00	0.35	0.99	0.373	0.93	Liquefiable Soil
2	2.50	4.00	3.25	54.44	22.57	15	0.80	0.90	1.33	1.05	15	1.70	26	68.30	0.50	1.20	31	NL	1.00	0.26	0.80	1.35	1.00	NL	0.98	0.367	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	81.20	34.62	16	0.85	0.90	1.33	1.05	17	1.70	29	76.35	0.50	1.20	35	NL	1.00	0.29	0.80	1.24	1.00	NL	0.96	0.353	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	109.59	48.30	27	0.95	0.90	1.33	1.05	32	1.44	46	25.00	4.29	1.12	56	NL	1.00	0.53	0.74	1.21	1.00	NL	0.95	0.337	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	137.99	61.99	33	0.95	0.90	1.33	1.05	39	1.27	50	23.39	4.11	1.10	59	NL	1.00	0.64	0.68	1.17	1.00	NL	0.94	0.327	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	167.15	76.44	49	0.95	0.90	1.33	1.05	59	1.14	67	24.57	4.24	1.11	79	NL	1.00	0.85	0.60	1.11	1.00	NL	0.93	0.317	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	196.70	91.28	47	1.00	0.90	1.33	1.05	59	1.05	62	55.70	0.50	1.20	75	NL	1.00	0.85	0.60	1.04	1.00	NL	0.89	0.298	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	226.25	106.12	100	1.00	0.90	1.33	1.05	126	0.97	122	71.29	0.50	1.20	147	NL	1.00	0.85	0.60	0.98	1.00	NL	0.85	0.282	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	255.80	120.96	69	1.00	0.90	1.33	1.05	87	0.91	79	73.72	0.50	1.20	95	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.266	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	286.15	136.60	48	1.00	0.90	1.33	1.05	60	0.86	52	71.06	0.50	1.20	62	NL	1.00	0.85	0.60	0.88	1.00	NL	0.77	0.251	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	316.90	152.64	52	1.00	0.90	1.33	1.05	65	0.81	53	46.31	0.50	1.20	64	NL	1.00	0.85	0.60	0.84	1.00	NL	0.73	0.235	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	347.65	168.68	73	1.00	0.90	1.33	1.05	92	0.77	71	20.77	3.74	1.08	80	NL	1.00	0.85	0.60	0.81	2.00	NL	0.69	0.221	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	378.40	184.72	100	1.00	0.90	1.33	1.05	126	0.74	92	27.24	4.50	1.13	109	NL	1.00	0.85	0.60	0.78	3.00	NL	0.65	0.207	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	408.35	199.96	100	1.00	0.90	1.33	1.05	126	0.71	89	19.23	3.48	1.07	99	NL	1.00	0.85	0.60	0.76	4.00	NL	0.61	0.193	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	437.90	214.80	100	1.00	0.90	1.33	1.05	126	0.68	86	25.63	4.35	1.12	100	NL	1.00	0.85	0.60	0.74	5.00	NL	0.57	0.180	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	467.45	229.64	100	1.00	0.90	1.33	1.05	126	0.66	83	71.30	0.50	1.20	100	NL	1.00	0.85	0.60	0.72	6.00	NL	0.53	0.167	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	497.00	244.48	100	1.00	0.90	1.33	1.05	126	0.64	80	52.08	0.50	1.20	97	NL	1.00	0.85	0.60	0.70	7.00	NL	0.49	0.154	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	526.55	259.32	100	1.00	0.90	1.33	1.05	126	0.62	78	75.00	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	8.00	NL	0.45	0.141	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	561.03	276.63	100	1.00	0.90	1.33	1.05	126	0.60	76	30.15	4.72	1.16	92	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.126	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	585.65	289.00	100	1.00	0.90	1.33	1.05	126	0.59	74	36.05	0.50	1.20	89	NL	1.00	0.85	0.60	0.65	10.00	NL	0.37	0.116	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-59
Chainage	6+429

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense to Dense, Greyish, fine-grained silty sand (SM)	0.00	8.25	18.93	9.12
2	Hard, Brownish to Brownish Yellow, fine-grained inorganic silt of low Pla	8.25	14.25	19.70	9.89
3	Very Dense, Brownish Grey, fine-grained silty sand with Gravel (SM)	14.25	23.25	20.50	10.69
4	Very Dense, Brownish to Greyish, fine-grained silty sand with Gravel (SI	23.25	35.00	20.50	10.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	23.66	11.40	11	0.75	0.90	1.33	1.05	10	1.70	18	24.34	4.22	1.11	24	0.27	1.00	0.19	0.80	1.54	1.00	0.42	0.99	0.321	1.30	Non Liquefiable Soil
2	2.50	4.00	3.25	61.52	29.65	18	0.80	0.90	1.33	1.05	18	1.70	31	32.45	4.85	1.17	41	NL	1.00	0.31	0.80	1.28	1.00	NL	0.98	0.316	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	89.92	43.34	26	0.85	0.90	1.33	1.05	28	1.52	42	37.87	0.50	1.20	51	NL	1.00	0.46	0.77	1.21	1.00	NL	0.96	0.312	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	118.31	57.02	29	0.95	0.90	1.33	1.05	35	1.32	46	24.10	4.19	1.11	55	NL	1.00	0.57	0.72	1.17	1.00	NL	0.95	0.308	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	146.71	70.71	33	0.95	0.90	1.33	1.05	39	1.19	47	21.26	3.82	1.09	55	NL	1.00	0.64	0.68	1.12	1.00	NL	0.94	0.304	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	175.87	85.16	38	0.95	0.90	1.33	1.05	45	1.08	49	28.57	4.61	1.14	61	NL	1.00	0.85	0.60	1.07	1.00	NL	0.93	0.299	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	205.42	100.00	46	1.00	0.90	1.33	1.05	58	1.00	58	76.61	0.50	1.20	70	NL	1.00	0.85	0.60	1.00	1.00	NL	0.89	0.284	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	234.97	114.84	49	1.00	0.90	1.33	1.05	62	0.93	57	70.84	0.50	1.20	69	NL	1.00	0.85	0.60	0.95	1.00	NL	0.85	0.270	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	264.52	129.68	52	1.00	0.90	1.33	1.05	65	0.88	57	74.76	0.50	1.20	69	NL	1.00	0.85	0.60	0.90	1.00	NL	0.81	0.257	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	294.87	145.32	81	1.00	0.90	1.33	1.05	102	0.83	84	66.03	0.50	1.20	102	NL	1.00	0.85	0.60	0.86	1.00	NL	0.77	0.243	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	325.62	161.36	85	1.00	0.90	1.33	1.05	107	0.79	84	38.70	0.50	1.20	101	NL	1.00	0.85	0.60	0.83	1.00	NL	0.73	0.229	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	356.37	177.40	88	1.00	0.90	1.33	1.05	111	0.75	83	17.21	3.06	1.06	91	NL	1.00	0.85	0.60	0.80	2.00	NL	0.69	0.215	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	387.12	193.44	100	1.00	0.90	1.33	1.05	126	0.72	90	22.90	4.05	1.10	103	NL	1.00	0.85	0.60	0.77	3.00	NL	0.65	0.202	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	417.87	209.48	100	1.00	0.90	1.33	1.05	126	0.69	87	27.50	4.52	1.13	103	NL	1.00	0.85	0.60	0.74	4.00	NL	0.61	0.189	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	448.62	225.52	100	1.00	0.90	1.33	1.05	126	0.67	84	27.45	4.52	1.13	99	NL	1.00	0.85	0.60	0.72	5.00	NL	0.57	0.176	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	479.37	241.56	100	1.00	0.90	1.33	1.05	126	0.64	81	29.60	4.68	1.15	98	NL	1.00	0.85	0.60	0.70	6.00	NL	0.53	0.163	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	510.12	257.60	100	1.00	0.90	1.33	1.05	126	0.62	78	31.06	4.77	1.16	96	NL	1.00	0.85	0.60	0.68	7.00	NL	0.49	0.150	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	540.87	273.64	100	1.00	0.90	1.33	1.05	126	0.60	76	25.67	4.36	1.12	89	NL	1.00	0.85	0.60	0.67	8.00	NL	0.45	0.138	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	576.75	292.35	100	1.00	0.90	1.33	1.05	126	0.58	74	25.81	4.37	1.12	87	NL	1.00	0.85	0.60	0.65	9.00	NL	0.40	0.123	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	602.37	305.72	100	1.00	0.90	1.33	1.05	126	0.57	72	27.56	4.53	1.13	86	NL	1.00	0.85	0.60	0.64	10.00	NL	0.37	0.113	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-60
Chainage	6+488

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense to Dense, Brownish to Greyish, fine-grained silty sand (S	0.00	8.25	18.93	9.12
2	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticity (	8.25	14.25	19.22	9.41
3	Very Dense, Grey to Red Brownish, fine-grained silty sand with Gravel (S	14.25	22.00	17.65	7.84
4	Very Dense, Brownish to Grey, fine-grained silty sand with Gravel (SM)	22.00	35.00	19.22	9.41

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	23.66	11.40	11	0.75	0.90	1.33	1.05	10	1.70	18	21.41	3.84	1.09	23	0.26	1.00	0.19	0.80	1.54	1.00	0.40	0.99	0.321	1.24	Non Liquefiable Soil
2	2.50	4.00	3.25	61.52	29.65	29	0.80	0.90	1.33	1.05	29	1.70	50	21.24	3.81	1.09	58	NL	1.00	0.48	0.76	1.34	1.00	NL	0.98	0.316	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	89.92	43.34	33	0.85	0.90	1.33	1.05	35	1.52	54	36.53	0.50	1.20	65	NL	1.00	0.58	0.71	1.27	1.00	NL	0.96	0.312	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	118.31	57.02	26	0.95	0.90	1.33	1.05	31	1.32	41	28.68	4.61	1.14	52	NL	1.00	0.51	0.75	1.15	1.00	NL	0.95	0.308	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	146.71	70.71	34	0.95	0.90	1.33	1.05	41	1.19	48	41.93	0.50	1.20	58	NL	1.00	0.85	0.60	1.15	1.00	NL	0.94	0.304	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	175.39	84.68	28	0.95	0.90	1.33	1.05	33	1.09	36	26.67	4.45	1.13	45	NL	1.00	0.55	0.73	1.05	1.00	NL	0.93	0.300	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	204.22	98.80	31	1.00	0.90	1.33	1.05	39	1.01	39	86.35	0.50	1.20	48	NL	1.00	0.63	0.68	1.00	1.00	NL	0.89	0.286	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	233.05	112.92	35	1.00	0.90	1.33	1.05	44	0.94	41	72.53	0.50	1.20	50	NL	1.00	0.85	0.60	0.95	1.00	NL	0.85	0.273	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	261.88	127.04	36	1.00	0.90	1.33	1.05	45	0.89	40	37.11	0.50	1.20	49	NL	1.00	0.85	0.60	0.91	1.00	NL	0.81	0.259	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	289.14	139.59	88	1.00	0.90	1.33	1.05	111	0.85	94	75.23	0.50	1.20	113	NL	1.00	0.85	0.60	0.88	1.00	NL	0.77	0.248	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	315.62	151.36	41	1.00	0.90	1.33	1.05	52	0.81	42	32.70	4.87	1.18	54	NL	1.00	0.85	0.60	0.85	1.00	NL	0.73	0.236	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	342.09	163.12	45	1.00	0.90	1.33	1.05	57	0.78	44	27.53	4.52	1.13	55	NL	1.00	0.85	0.60	0.82	2.00	NL	0.69	0.225	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	368.57	174.89	43	1.00	0.90	1.33	1.05	54	0.76	41	23.77	4.15	1.11	49	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.213	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	395.04	186.65	56	1.00	0.90	1.33	1.05	70	0.73	52	19.98	3.61	1.08	59	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	422.70	199.59	100	1.00	0.90	1.33	1.05	126	0.71	89	24.23	4.21	1.11	103	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.187	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	451.53	213.71	100	1.00	0.90	1.33	1.05	126	0.68	86	21.85	3.90	1.09	98	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.36	227.83	100	1.00	0.90	1.33	1.05	126	0.66	83	47.89	0.50	1.20	100	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	509.19	241.95	100	1.00	0.90	1.33	1.05	126	0.64	81	26.70	4.45	1.13	96	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	542.82	258.43	100	1.00	0.90	1.33	1.05	126	0.62	78	18.13	3.26	1.07	87	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	566.85	270.19	100	1.00	0.90	1.33	1.05	126	0.61	76	25.21	4.31	1.12	90	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

B.8. Zone 8: CH: 6+490 km to 7+490 km (BH-61 to BH-70)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-61	0.00	2.50	11	10	18	23	0.41	0.37	1.11	Liquefiable Soil
BH-62	0.00	2.50	10	9	16	20	0.35	0.37	0.93	Liquefiable Soil
BH-62	2.50	4.00	10	10	17	21	0.31	0.37	0.84	Liquefiable Soil
BH-64	0.00	2.50	8	8	13	16	0.27	0.35	0.77	Liquefiable Soil
BH-64	2.50	4.00	8	8	14	17	0.24	0.34	0.69	Liquefiable Soil
BH-64	4.00	5.50	11	12	19	24	0.34	0.34	1.01	Liquefiable Soil
BH-65	0.00	2.50	7	7	11	14	0.24	0.37	0.66	Liquefiable Soil
BH-65	2.50	4.00	7	7	12	18	0.25	0.37	0.69	Liquefiable Soil
BH-67	0.00	2.50	11	10	18	18	0.31	0.37	0.85	Liquefiable Soil
BH-69	0.00	2.50	11	10	18	22	0.39	0.37	1.04	Liquefiable Soil
BH-69A	0.00	2.50	10	9	16	24	0.44	0.37	1.19	Liquefiable Soil
BH-69B	0.00	2.50	7	7	11	14	0.24	0.37	0.66	Liquefiable Soil
BH-69B	2.50	4.00	9	9	15	19	0.27	0.37	0.75	Liquefiable Soil
BH-69B	4.00	5.50	9	10	16	23	0.32	0.36	0.88	Liquefiable Soil
BH-69B	7.00	8.50	14	17	23	28	0.41	0.35	1.16	Liquefiable Soil
BH-70	0.00	2.50	9	8	14	19	0.33	0.37	0.89	Liquefiable Soil
BH-70	2.50	4.00	9	9	15	20	0.29	0.37	0.80	Liquefiable Soil
BH-70	4.00	5.50	10	11	18	25	0.37	0.36	1.03	Liquefiable Soil
BH-70	5.50	7.00	11	13	20	24	0.33	0.36	0.93	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-61
Chainage	6+639

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Brownish, fine-grained silty sand (SM)	0.00	4.00	16.77	6.96
2	Dense, Greyish, fine-grained silty sand (SM)	4.00	8.25	17.95	8.14
3	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand ar	8.25	14.25	20.20	10.39
4	Dense to Very Dense, Greyish, fine-grained silty sand (SM)	14.25	20.25	17.65	7.84
5	Very Dense, Greyish, fine-grained silty sand with Gravel (SM)	20.25	26.25	19.90	10.09
6	Very Dense, Brownish, Gray, fine-grained silty sand with Gravel (SM)	26.25	35.00	19.90	10.09

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.96	8.70	11	0.75	0.90	1.33	1.05	10	1.70	18	20.41	3.68	1.08	23	0.25	1.00	0.19	0.80	1.63	1.00	0.41	0.99	0.372	1.11	Liquefiable Soil
2	2.50	4.00	3.25	54.50	22.63	18	0.80	0.90	1.33	1.05	18	1.70	31	18.25	3.29	1.07	36	NL	1.00	0.31	0.80	1.35	1.00	NL	0.98	0.366	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	80.54	33.96	35	0.85	0.90	1.33	1.05	37	1.70	64	31.70	4.81	1.17	79	NL	1.00	0.61	0.70	1.39	1.00	NL	0.96	0.357	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	107.47	46.18	40	0.95	0.90	1.33	1.05	48	1.47	70	20.49	3.70	1.08	80	NL	1.00	0.85	0.60	1.36	1.00	NL	0.95	0.346	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	134.39	58.39	38	0.95	0.90	1.33	1.05	45	1.31	59	30.33	4.73	1.16	73	NL	1.00	0.85	0.60	1.24	1.00	NL	0.94	0.338	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	163.57	72.86	43	0.95	0.90	1.33	1.05	51	1.17	60	26.46	4.43	1.13	72	NL	1.00	0.85	0.60	1.14	1.00	NL	0.93	0.325	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	193.87	88.45	54	1.00	0.90	1.33	1.05	68	1.06	72	86.04	0.50	1.20	87	NL	1.00	0.85	0.60	1.05	1.00	NL	0.89	0.303	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	224.17	104.04	37	1.00	0.90	1.33	1.05	47	0.98	46	70.84	0.50	1.20	55	NL	1.00	0.85	0.60	0.98	1.00	NL	0.85	0.285	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	254.47	119.63	38	1.00	0.90	1.33	1.05	48	0.91	44	61.00	0.50	1.20	53	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.268	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	282.22	132.67	49	1.00	0.90	1.33	1.05	62	0.87	53	74.75	0.50	1.20	65	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.254	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	308.69	144.43	57	1.00	0.90	1.33	1.05	72	0.83	60	39.91	0.50	1.20	72	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.242	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	335.17	156.20	62	1.00	0.90	1.33	1.05	78	0.80	62	20.41	3.68	1.08	71	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.230	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	361.64	167.96	67	1.00	0.90	1.33	1.05	84	0.77	65	46.46	0.50	1.20	78	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.217	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.37	181.98	74	1.00	0.90	1.33	1.05	93	0.74	69	21.75	3.89	1.09	79	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.22	197.12	100	1.00	0.90	1.33	1.05	126	0.71	90	31.23	4.78	1.16	109	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	450.07	212.26	100	1.00	0.90	1.33	1.05	126	0.69	86	28.19	4.58	1.14	103	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	479.92	227.40	100	1.00	0.90	1.33	1.05	126	0.66	83	26.12	4.40	1.12	98	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	509.77	242.54	100	1.00	0.90	1.33	1.05	126	0.64	81	22.90	4.05	1.10	93	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	544.59	260.20	100	1.00	0.90	1.33	1.05	126	0.62	78	38.80	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	569.47	272.82	100	1.00	0.90	1.33	1.05	126	0.61	76	20.17	3.64	1.08	86	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.119	NL	Non Liquefiable Soil
	31.00	32.50	31.75	599.32	287.96	100	1.00	0.90	1.33	1.05	126	0.59	74	36.89	0.50	1.20	89	NL	1.00	0.85	0.60	0.66	10.00	NL	0.33	0.106	NL	Non Liquefiable Soil
	32.50	35.00	33.75	639.12	308.14	100	1.00	0.90	1.33	1.05	126	0.57	72	40.17	0.50	1.20	86	NL	1.00	0.85	0.60	0.64	10.00	NL	0.27	0.088	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-62
Chainage	6+726

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Brownish, fine-grained silty sand (SM)	0.00	9.25	16.77	6.96
2	Loose to Medium Dense, Greyish, fine-grained silty sand with gravel (SM)	9.25	12.25	16.77	6.96
3	Very Dense, Greyish, fine-grained silty sand with gravel (SM)	12.25	22.00	19.90	10.09
4	Very Dense, Yellowish Red, fine-grained silty sand with Gravel (SM)	22.00	29.25	19.90	10.09
5	Hard, Yellowish Brown, fine-grained inorganic silt of low Plasticity with	29.25	35.00	20.20	10.39

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.00	2.50	1.25	20.96	8.70	10	0.75	0.90	1.33	1.05	9	1.70	16	79.05	0.50	1.20	20	0.21	1.00	0.17	0.80	1.63	1.00	0.35	0.99	0.372	0.93	Liquefiable Soil
2	2.50	4.00	3.25	54.50	22.63	10	0.80	0.90	1.33	1.05	10	1.70	17	73.46	0.50	1.20	21	0.23	1.00	0.18	0.80	1.35	1.00	0.31	0.98	0.366	0.84	Liquefiable Soil
3	4.00	5.50	4.75	79.66	33.08	20	0.85	0.90	1.33	1.05	21	1.70	36	70.83	0.50	1.20	44	NL	1.00	0.36	0.80	1.25	1.00	NL	0.96	0.362	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	104.81	43.52	29	0.95	0.90	1.33	1.05	35	1.52	52	68.38	0.50	1.20	63	NL	1.00	0.57	0.72	1.27	1.00	NL	0.95	0.358	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	129.97	53.97	22	0.95	0.90	1.33	1.05	26	1.36	36	75.89	0.50	1.20	43	NL	1.00	0.43	0.78	1.14	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	155.12	64.41	51	0.95	0.90	1.33	1.05	61	1.25	76	59.36	0.50	1.20	92	NL	1.00	0.85	0.60	1.19	1.00	NL	0.93	0.349	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	180.28	74.86	44	1.00	0.90	1.33	1.05	55	1.16	64	20.18	3.65	1.08	73	NL	1.00	0.85	0.60	1.12	1.00	NL	0.89	0.333	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	205.43	85.30	61	1.00	0.90	1.33	1.05	77	1.08	83	39.00	0.50	1.20	100	NL	1.00	0.85	0.60	1.07	1.00	NL	0.85	0.318	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	235.28	100.44	65	1.00	0.90	1.33	1.05	82	1.00	82	23.00	4.06	1.10	94	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.295	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	265.13	115.58	77	1.00	0.90	1.33	1.05	97	0.93	90	35.06	0.50	1.20	109	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.274	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	294.98	130.72	84	1.00	0.90	1.33	1.05	106	0.87	92	21.18	3.81	1.09	104	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.256	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	324.83	145.86	67	1.00	0.90	1.33	1.05	84	0.83	70	32.83	4.87	1.18	87	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.239	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	354.68	161.00	73	1.00	0.90	1.33	1.05	92	0.79	72	20.21	3.65	1.08	82	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.222	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	384.53	176.14	52	1.00	0.90	1.33	1.05	65	0.75	49	34.48	4.95	1.19	64	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	414.38	191.28	54	1.00	0.90	1.33	1.05	68	0.72	49	28.03	4.56	1.14	60	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.191	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	444.23	206.42	81	1.00	0.90	1.33	1.05	102	0.70	71	39.10	0.50	1.20	86	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	474.08	221.56	88	1.00	0.90	1.33	1.05	111	0.67	74	22.89	4.04	1.10	86	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	503.93	236.70	94	1.00	0.90	1.33	1.05	118	0.65	77	33.34	4.90	1.18	96	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	538.76	254.36	100	1.00	0.90	1.33	1.05	126	0.63	79	26.80	4.46	1.13	93	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	563.93	267.28	100	1.00	0.90	1.33	1.05	126	0.61	77	31.45	4.80	1.17	94	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil
	31.00	32.50	31.75	594.23	282.87	100	1.00	0.90	1.33	1.05	126	0.59	75	64.10	0.50	1.20	90	NL	1.00	0.85	0.60	0.66	10.00	NL	0.33	0.107	NL	Non Liquefiable Soil
	32.50	35.00	33.75	634.63	303.66	100	1.00	0.90	1.33	1.05	126	0.57	72	52.73	0.50	1.20	87	NL	1.00	0.85	0.60	0.64	10.00	NL	0.27	0.089	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-63
Chainage	6+838

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense to Dense, Greyish, fine-grained silty sand with gravel (SM	0.00	4.00	17.94	8.13
2	Very stiff to Hard, brownish, fine grained inorganic silt of low compressi	4.00	11.25	19.22	9.41
3	Very Dense, Brownish Gray, fine-grained silty sand (SM)	11.25	20.25	19.90	10.09
4	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand (M	20.25	26.25	20.20	10.39
5	Very Dense, Brownish Gray, fine-grained silty sand (SM)	26.25	35.00	19.90	10.09

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	1.00

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.00	2.50	1.25	22.43	10.17	11	0.75	0.90	1.33	1.05	10	1.70	18	26.84	4.46	1.13	24	0.28	1.00	0.19	0.80	1.58	1.00	0.44	0.99	0.341	1.30	Non Liquefiable Soil
2	2.50	4.00	3.25	58.31	26.43	12	0.80	0.90	1.33	1.05	12	1.70	21	31.29	4.79	1.17	29	0.40	1.00	0.21	0.80	1.30	1.00	0.52	0.98	0.336	1.54	Non Liquefiable Soil
3	4.00	5.50	4.75	86.18	39.59	46	0.85	0.90	1.33	1.05	49	1.59	78	67.68	0.50	1.20	94	NL	1.00	0.85	0.60	1.45	1.00	NL	0.96	0.327	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	115.01	53.71	58	0.95	0.90	1.33	1.05	69	1.36	94	18.91	3.42	1.07	105	NL	1.00	0.85	0.60	1.28	1.00	NL	0.95	0.318	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	143.84	67.83	25	0.95	0.90	1.33	1.05	30	1.21	36	76.47	0.50	1.20	44	NL	1.00	0.49	0.76	1.10	1.00	NL	0.94	0.311	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	172.67	81.95	42	0.95	0.90	1.33	1.05	50	1.10	55	71.15	0.50	1.20	67	NL	1.00	0.85	0.60	1.08	1.00	NL	0.93	0.305	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	201.50	96.07	56	1.00	0.90	1.33	1.05	70	1.02	72	72.34	0.50	1.20	87	NL	1.00	0.85	0.60	1.02	1.00	NL	0.89	0.290	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	231.01	110.87	52	1.00	0.90	1.33	1.05	65	0.95	62	25.64	4.35	1.12	74	NL	1.00	0.85	0.60	0.96	1.00	NL	0.85	0.275	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	260.86	126.01	61	1.00	0.90	1.33	1.05	77	0.89	68	28.98	4.64	1.15	83	NL	1.00	0.85	0.60	0.91	1.00	NL	0.81	0.261	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	290.71	141.15	69	1.00	0.90	1.33	1.05	87	0.84	73	30.47	4.74	1.16	89	NL	1.00	0.85	0.60	0.87	1.00	NL	0.77	0.246	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	320.56	156.29	76	1.00	0.90	1.33	1.05	96	0.80	76	29.42	4.67	1.15	93	NL	1.00	0.85	0.60	0.84	1.00	NL	0.73	0.233	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	350.41	171.43	100	1.00	0.90	1.33	1.05	126	0.76	96	37.83	0.50	1.20	116	NL	1.00	0.85	0.60	0.81	2.00	NL	0.69	0.219	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	380.26	186.57	100	1.00	0.90	1.33	1.05	126	0.73	92	27.89	4.55	1.14	109	NL	1.00	0.85	0.60	0.78	3.00	NL	0.65	0.206	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	410.41	202.01	100	1.00	0.90	1.33	1.05	126	0.70	88	70.55	0.50	1.20	107	NL	1.00	0.85	0.60	0.75	4.00	NL	0.61	0.192	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	440.71	217.60	100	1.00	0.90	1.33	1.05	126	0.68	85	72.90	0.50	1.20	103	NL	1.00	0.85	0.60	0.73	5.00	NL	0.57	0.179	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	471.01	233.19	65	1.00	0.90	1.33	1.05	82	0.65	53	62.36	0.50	1.20	65	NL	1.00	0.85	0.60	0.71	6.00	NL	0.53	0.166	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	501.31	248.78	76	1.00	0.90	1.33	1.05	96	0.63	61	72.70	0.50	1.20	73	NL	1.00	0.85	0.60	0.69	7.00	NL	0.49	0.153	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	531.31	264.07	100	1.00	0.90	1.33	1.05	126	0.62	77	22.30	3.97	1.10	89	NL	1.00	0.85	0.60	0.68	8.00	NL	0.45	0.140	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	566.13	281.74	100	1.00	0.90	1.33	1.05	126	0.60	75	29.69	4.69	1.15	91	NL	1.00	0.85	0.60	0.66	9.00	NL	0.40	0.125	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	591.01	294.35	100	1.00	0.90	1.33	1.05	126	0.58	73	20.58	3.71	1.08	83	NL	1.00	0.85	0.60	0.65	10.00	NL	0.37	0.115	NL	Non Liquefiable Soil
	31.00	32.50	31.75	620.86	309.49	100	1.00	0.90	1.33	1.05	126	0.57	71	27.70	4.54	1.14	86	NL	1.00	0.85	0.60	0.64	10.00	NL	0.33	0.102	NL	Non Liquefiable Soil
	32.50	35.00	33.75	660.66	329.68	100	1.00	0.90	1.33	1.05	126	0.55	69	22.25	3.96	1.09	80	NL	1.00	0.85	0.60	0.62	10.00	NL	0.27	0.085	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-64
Chainage	6+925

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium stiff to Stiff, Brownish, fine-grained inorganic silt of low Plastici	0.00	4.00	17.65	7.84
2	Medium Dense to Dense, Yellowish Brown, fine-grained silty sand with G	4.00	11.25	17.95	8.14
3	Very Dense, Yellowish Brown, fine-grained silty sand with Gravel (SM)	11.25	14.25	19.90	10.09
4	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand ar	14.25	20.25	20.20	10.39
5	Very Dense, Brownish, fine-grained silty sand with Gravel (SM)	20.25	28.00	19.90	10.09
6	Very Dense, Whitish Brown to Whitish Grey, fine-grained silty sand (SM)	28.00	35.00	19.90	10.09

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.06	9.80	8	0.75	0.90	1.33	1.05	8	1.70	13	71.15	0.50	1.20	16	0.17	1.00	0.13	0.80	1.59	1.00	0.27	0.99	0.348	0.77	Liquefiable Soil
2	2.50	4.00	3.25	57.36	25.49	8	0.80	0.90	1.33	1.05	8	1.70	14	72.17	0.50	1.20	17	0.18	1.00	0.15	0.80	1.31	1.00	0.24	0.98	0.342	0.69	Liquefiable Soil
3	4.00	5.50	4.75	84.06	37.48	11	0.85	0.90	1.33	1.05	12	1.63	19	20.19	3.65	1.08	24	0.28	1.00	0.21	0.80	1.22	1.00	0.34	0.96	0.337	1.01	Liquefiable Soil
4	5.50	7.00	6.25	110.99	49.70	28	0.95	0.90	1.33	1.05	33	1.42	47	24.40	4.22	1.11	57	NL	1.00	0.55	0.73	1.21	1.00	NL	0.95	0.332	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	137.91	61.91	34	0.95	0.90	1.33	1.05	41	1.27	52	20.69	3.73	1.08	60	NL	1.00	0.85	0.60	1.21	1.00	NL	0.94	0.327	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	164.84	74.13	33	0.95	0.90	1.33	1.05	39	1.16	46	42.40	0.50	1.20	55	NL	1.00	0.64	0.68	1.10	1.00	NL	0.93	0.322	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.76	86.34	39	1.00	0.90	1.33	1.05	49	1.08	53	23.08	4.07	1.10	62	NL	1.00	0.85	0.60	1.06	1.00	NL	0.89	0.307	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	220.64	100.51	54	1.00	0.90	1.33	1.05	68	1.00	68	30.83	4.76	1.16	83	NL	1.00	0.85	0.60	1.00	1.00	NL	0.85	0.290	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	250.49	115.65	57	1.00	0.90	1.33	1.05	72	0.93	67	29.19	4.65	1.15	81	NL	1.00	0.85	0.60	0.94	1.00	NL	0.81	0.273	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	280.64	131.09	60	1.00	0.90	1.33	1.05	75	0.87	66	60.09	0.50	1.20	80	NL	1.00	0.85	0.60	0.90	1.00	NL	0.77	0.256	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	310.94	146.68	65	1.00	0.90	1.33	1.05	82	0.83	67	74.56	0.50	1.20	81	NL	1.00	0.85	0.60	0.86	1.00	NL	0.73	0.240	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	341.24	162.27	100	1.00	0.90	1.33	1.05	126	0.79	99	70.00	0.50	1.20	119	NL	1.00	0.85	0.60	0.82	2.00	NL	0.69	0.225	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	371.54	177.86	100	1.00	0.90	1.33	1.05	126	0.75	94	69.03	0.50	1.20	114	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.211	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	401.54	193.15	100	1.00	0.90	1.33	1.05	126	0.72	90	47.15	0.50	1.20	109	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.197	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	431.39	208.29	100	1.00	0.90	1.33	1.05	126	0.69	87	22.02	3.93	1.09	99	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.183	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	461.24	223.43	72	1.00	0.90	1.33	1.05	90	0.67	61	34.92	4.97	1.20	77	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.170	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	491.09	238.57	95	1.00	0.90	1.33	1.05	119	0.65	77	25.89	4.38	1.12	91	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.156	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	520.94	253.71	100	1.00	0.90	1.33	1.05	126	0.63	79	34.64	4.96	1.19	99	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.143	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	555.76	271.37	100	1.00	0.90	1.33	1.05	126	0.61	76	22.54	4.00	1.10	88	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.128	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	580.64	283.99	100	1.00	0.90	1.33	1.05	126	0.59	75	28.64	4.61	1.14	90	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.117	NL	Non Liquefiable Soil
	31.00	32.50	31.75	610.49	299.13	100	1.00	0.90	1.33	1.05	126	0.58	73	24.40	4.22	1.11	85	NL	1.00	0.85	0.60	0.65	10.00	NL	0.33	0.104	NL	Non Liquefiable Soil
	32.50	35.00	33.75	650.29	319.31	100	1.00	0.90	1.33	1.05	126	0.56	70	30.18	4.72	1.16	86	NL	1.00	0.85	0.60	0.63	10.00	NL	0.27	0.087	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-65
Chainage	6+998

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium, Brownish Gray, fine-grained silty sand (SM)	0.00	8.25	16.78	6.97
2	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with san	8.25	12.25	19.22	9.41
3	Dense, Brownish, Coarse-grained silty Gravel (GM)	12.25	18.25	17.95	8.14
4	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand (M	18.25	26.25	20.20	10.39
5	Very Dense, Little Brownish, fine-grained silty sand with Gravel (SM)	26.25	35.00	19.90	10.09

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_{1)60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.00	2.50	1.25	20.98	8.72	7	0.75	0.90	1.33	1.05	7	1.70	11	71.15	0.50	1.20	14	0.15	1.00	0.10	0.80	1.63	1.00	0.24	0.99	0.372	0.66	Liquefiable Soil
2	2.50	4.00	3.25	54.54	22.66	7	0.80	0.90	1.33	1.05	7	1.70	12	25.01	4.29	1.12	18	0.19	1.00	0.11	0.80	1.35	1.00	0.25	0.98	0.366	0.69	Liquefiable Soil
3	4.00	5.50	4.75	79.71	33.12	13	0.85	0.90	1.33	1.05	14	1.70	24	30.80	4.76	1.16	32	NL	1.00	0.24	0.80	1.25	1.00	NL	0.96	0.362	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	104.88	43.58	19	0.95	0.90	1.33	1.05	23	1.51	34	20.00	3.61	1.08	41	NL	1.00	0.38	0.80	1.18	1.00	NL	0.95	0.357	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	130.05	54.04	27	0.95	0.90	1.33	1.05	32	1.36	44	71.77	0.50	1.20	53	NL	1.00	0.53	0.74	1.18	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.66	66.94	30	0.95	0.90	1.33	1.05	36	1.22	44	25.00	4.29	1.12	53	NL	1.00	0.58	0.71	1.12	1.00	NL	0.93	0.341	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.49	81.06	30	1.00	0.90	1.33	1.05	38	1.11	42	71.81	0.50	1.20	51	NL	1.00	0.61	0.69	1.07	1.00	NL	0.89	0.318	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.32	95.18	44	1.00	0.90	1.33	1.05	55	1.02	57	69.30	0.50	1.20	69	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.299	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	242.24	107.40	50	1.00	0.90	1.33	1.05	63	0.96	61	67.62	0.50	1.20	73	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.284	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.17	119.61	41	1.00	0.90	1.33	1.05	52	0.91	47	27.74	4.54	1.14	58	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.269	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	296.09	131.83	45	1.00	0.90	1.33	1.05	57	0.87	49	37.87	0.50	1.20	60	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.255	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	323.02	144.04	57	1.00	0.90	1.33	1.05	72	0.83	60	18.34	3.30	1.07	67	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.240	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	353.32	159.63	65	1.00	0.90	1.33	1.05	82	0.79	65	29.00	4.64	1.15	79	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	383.62	175.22	69	1.00	0.90	1.33	1.05	87	0.76	66	68.52	0.50	1.20	79	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	413.92	190.81	70	1.00	0.90	1.33	1.05	88	0.72	64	65.56	0.50	1.20	77	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	444.22	206.40	100	1.00	0.90	1.33	1.05	126	0.70	87	67.32	0.50	1.20	105	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	474.52	221.99	100	1.00	0.90	1.33	1.05	126	0.67	84	67.22	0.50	1.20	102	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.52	237.28	100	1.00	0.90	1.33	1.05	126	0.65	82	72.60	0.50	1.20	98	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	539.34	254.95	100	1.00	0.90	1.33	1.05	126	0.63	79	27.91	4.55	1.14	94	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	564.22	267.56	100	1.00	0.90	1.33	1.05	126	0.61	77	28.32	4.59	1.14	92	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil
	31.00	32.50	31.75	594.07	282.70	100	1.00	0.90	1.33	1.05	126	0.59	75	44.30	0.50	1.20	90	NL	1.00	0.85	0.60	0.66	10.00	NL	0.33	0.107	NL	Non Liquefiable Soil
	32.50	35.00	33.75	633.87	302.89	100	1.00	0.90	1.33	1.05	126	0.57	72	18.90	3.41	1.07	81	NL	1.00	0.85	0.60	0.64	10.00	NL	0.27	0.089	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-66
Chainage	7+129

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff, Brownish Gray, fine-grained inorganic silt of low Plasticity w	0.00	4.00	17.65	7.84
2	Medium Dense, Greyish, fine-grained silty sand with Gravel (SM	4.00	8.25	16.78	6.97
3	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Pla	8.25	14.25	19.22	9.41
4	Very Dense, Greyish to Little Brown, fine-grained silty sand with	14.25	24.25	19.90	10.09
5	Very Dense, Brownish, fine-grained silty sand with Little Gravel	24.25	30.00	19.90	10.09

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.06	9.80	12	0.75	0.90	1.33	1.05	11	1.70	19	73.33	0.50	1.20	24	0.27	1.00	0.20	0.80	1.59	1.00	0.42	0.99	0.348	1.22	Non Liquefiable Soil
2	2.50	4.00	3.25	57.36	25.49	15	0.80	0.90	1.33	1.05	15	1.70	26	54.37	0.50	1.20	31	NL	1.00	0.26	0.80	1.31	1.00	NL	0.98	0.342	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	83.19	36.60	17	0.85	0.90	1.33	1.05	18	1.65	30	22.04	3.93	1.09	37	NL	1.00	0.31	0.80	1.22	1.00	NL	0.96	0.342	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	108.36	47.06	23	0.95	0.90	1.33	1.05	27	1.46	40	17.25	3.07	1.06	46	NL	1.00	0.45	0.77	1.19	1.00	NL	0.95	0.342	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.53	57.52	26	0.95	0.90	1.33	1.05	31	1.32	41	33.61	4.91	1.18	53	NL	1.00	0.51	0.75	1.15	1.00	NL	0.94	0.341	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	161.14	70.42	24	0.95	0.90	1.33	1.05	29	1.19	34	74.46	0.50	1.20	41	NL	1.00	0.47	0.76	1.09	1.00	NL	0.93	0.332	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	189.97	84.54	26	1.00	0.90	1.33	1.05	33	1.09	36	67.02	0.50	1.20	43	NL	1.00	0.53	0.73	1.05	1.00	NL	0.89	0.311	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.80	98.66	33	1.00	0.90	1.33	1.05	41	1.01	42	64.86	0.50	1.20	51	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.293	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.63	112.78	44	1.00	0.90	1.33	1.05	55	0.94	52	70.69	0.50	1.20	63	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.276	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	277.14	127.58	61	1.00	0.90	1.33	1.05	77	0.89	68	26.06	4.39	1.12	81	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.260	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	306.99	142.72	67	1.00	0.90	1.33	1.05	84	0.84	70	29.24	4.65	1.15	86	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.244	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	336.84	157.86	77	1.00	0.90	1.33	1.05	97	0.80	77	36.29	0.50	1.20	93	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.229	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	366.69	173.00	83	1.00	0.90	1.33	1.05	104	0.76	79	20.50	3.70	1.08	90	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.214	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	396.54	188.14	82	1.00	0.90	1.33	1.05	103	0.73	75	31.00	4.77	1.16	92	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.199	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	426.39	203.28	73	1.00	0.90	1.33	1.05	92	0.70	64	26.40	4.43	1.13	77	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.185	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	456.24	218.42	78	1.00	0.90	1.33	1.05	98	0.68	66	28.96	4.63	1.15	81	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.172	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	486.09	233.56	84	1.00	0.90	1.33	1.05	106	0.65	69	26.71	4.45	1.13	82	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	515.94	248.70	78	1.00	0.90	1.33	1.05	98	0.63	62	26.71	4.45	1.13	75	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	550.76	266.37	86	1.00	0.90	1.33	1.05	108	0.61	66	29.10	4.64	1.15	81	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	575.64	278.98	100	1.00	0.90	1.33	1.05	126	0.60	75	35.24	0.50	1.20	91	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.118	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-67
Chainage	7+220

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Whiteish Gray to Brownish Grey, fine-grained si	0.00	8.25	16.78	6.97
2	Very Stiff to Hard, Yellowish, fine-grained inorganic silt of low Pl	8.25	11.25	19.22	9.41
3	Medium Dense to Dense, Yellowish, fine-grained silty sand with	11.25	16.00	17.94	8.13
4	Very Dense, Brownish to Greyish to Little Brown, fine-grained si	16.00	23.25	19.90	10.09
5	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with	23.25	30.00	20.20	10.39

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.98	8.72	11	0.75	0.90	1.33	1.05	10	1.70	18	7.95	0.29	1.01	18	0.19	1.00	0.19	0.80	1.63	1.00	0.31	0.99	0.372	0.85	Liquefiable Soil
2	2.50	4.00	3.25	54.54	22.66	16	0.80	0.90	1.33	1.05	16	1.70	27	23.07	4.07	1.10	34	NL	1.00	0.27	0.80	1.35	1.00	NL	0.98	0.366	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	79.71	33.12	18	0.85	0.90	1.33	1.05	19	1.70	33	17.33	3.09	1.06	38	NL	1.00	0.32	0.80	1.25	1.00	NL	0.96	0.362	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	104.88	43.58	20	0.95	0.90	1.33	1.05	24	1.51	36	25.89	4.38	1.12	45	NL	1.00	0.40	0.80	1.18	1.00	NL	0.95	0.357	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	130.05	54.04	29	0.95	0.90	1.33	1.05	35	1.36	47	87.94	0.50	1.20	57	NL	1.00	0.57	0.72	1.19	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.66	66.94	37	0.95	0.90	1.33	1.05	44	1.22	54	72.90	0.50	1.20	65	NL	1.00	0.85	0.60	1.17	1.00	NL	0.93	0.341	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.49	81.06	44	1.00	0.90	1.33	1.05	55	1.11	61	25.65	4.35	1.12	73	NL	1.00	0.85	0.60	1.09	1.00	NL	0.89	0.318	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	214.04	93.90	27	1.00	0.90	1.33	1.05	34	1.03	35	18.92	3.42	1.07	41	NL	1.00	0.55	0.72	1.02	1.00	NL	0.85	0.301	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	240.95	106.10	35	1.00	0.90	1.33	1.05	44	0.97	43	31.10	4.78	1.16	54	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.286	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	267.86	118.30	46	1.00	0.90	1.33	1.05	58	0.92	53	18.74	3.38	1.07	60	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.271	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	296.24	131.97	51	1.00	0.90	1.33	1.05	64	0.87	56	39.65	0.50	1.20	67	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.254	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	326.09	147.11	59	1.00	0.90	1.33	1.05	74	0.82	61	20.00	3.61	1.08	70	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.237	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	355.94	162.25	66	1.00	0.90	1.33	1.05	83	0.79	65	18.10	3.25	1.07	73	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.221	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	385.79	177.39	74	1.00	0.90	1.33	1.05	93	0.75	70	30.71	4.75	1.16	86	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.206	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	415.64	192.53	81	1.00	0.90	1.33	1.05	102	0.72	73	69.08	0.50	1.20	89	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.191	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	445.79	207.97	47	1.00	0.90	1.33	1.05	59	0.69	41	76.57	0.50	1.20	50	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.176	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	476.09	223.56	54	1.00	0.90	1.33	1.05	68	0.67	45	68.57	0.50	1.20	55	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	506.39	239.15	64	1.00	0.90	1.33	1.05	80	0.65	52	75.00	0.50	1.20	63	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	541.74	257.34	78	1.00	0.90	1.33	1.05	98	0.62	61	71.06	0.50	1.20	74	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	566.99	270.33	73	1.00	0.90	1.33	1.05	92	0.61	56	71.06	0.50	1.20	67	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-68
Chainage	7+268

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense to Dense, Greyish, fine-grained silty sand (SM)	0.00	11.25	17.95	8.14
2	Hard, Yellow Brownish to Grey, fine-grained inorganic silt of low Plastici	11.25	18.25	20.20	10.39
3	Very Dense, Greyish, fine-grained silty sand (SM)	18.25	24.25	19.90	10.09
4	Hard, Red Brownish, fine-grained inorganic silt of low Plasticity with sar	24.25	30.00	20.30	10.49

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.44	10.18	12	0.75	0.90	1.33	1.05	11	1.70	19	40.29	0.50	1.20	24	0.27	1.00	0.20	0.80	1.58	1.00	0.42	0.99	0.341	1.23	Non Liquefiable Soil
2	2.50	4.00	3.25	58.34	26.47	16	0.80	0.90	1.33	1.05	16	1.70	27	23.02	4.06	1.10	34	NL	1.00	0.27	0.80	1.30	1.00	NL	0.98	0.335	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	85.26	38.68	18	0.85	0.90	1.33	1.05	19	1.61	31	33.00	4.88	1.18	41	NL	1.00	0.32	0.80	1.21	1.00	NL	0.96	0.331	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	112.19	50.90	23	0.95	0.90	1.33	1.05	27	1.40	38	19.26	3.48	1.07	45	NL	1.00	0.45	0.77	1.16	1.00	NL	0.95	0.327	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	139.11	63.11	26	0.95	0.90	1.33	1.05	31	1.26	39	20.50	3.70	1.08	46	NL	1.00	0.51	0.75	1.12	1.00	NL	0.94	0.323	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	166.04	75.33	34	0.95	0.90	1.33	1.05	41	1.15	47	20.54	3.70	1.08	54	NL	1.00	0.85	0.60	1.12	1.00	NL	0.93	0.320	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	192.96	87.54	38	1.00	0.90	1.33	1.05	48	1.07	51	70.00	0.50	1.20	62	NL	1.00	0.85	0.60	1.05	1.00	NL	0.89	0.305	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	222.14	102.01	29	1.00	0.90	1.33	1.05	36	0.99	36	75.01	0.50	1.20	44	NL	1.00	0.59	0.70	0.99	1.00	NL	0.85	0.288	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	252.44	117.60	34	1.00	0.90	1.33	1.05	43	0.92	39	57.93	0.50	1.20	48	NL	1.00	0.85	0.60	0.94	1.00	NL	0.81	0.270	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	282.74	133.19	52	1.00	0.90	1.33	1.05	65	0.87	57	70.69	0.50	1.20	68	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.254	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	313.04	148.78	61	1.00	0.90	1.33	1.05	77	0.82	63	61.46	0.50	1.20	76	NL	1.00	0.85	0.60	0.85	1.00	NL	0.73	0.239	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	343.34	164.37	64	1.00	0.90	1.33	1.05	80	0.78	63	21.13	3.80	1.09	72	NL	1.00	0.85	0.60	0.82	2.00	NL	0.69	0.224	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	373.19	179.51	73	1.00	0.90	1.33	1.05	92	0.75	68	23.18	4.08	1.10	80	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.210	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	403.04	194.65	74	1.00	0.90	1.33	1.05	93	0.72	67	31.74	4.81	1.17	83	NL	1.00	0.85	0.60	0.77	4.00	NL	0.61	0.196	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	432.89	209.79	78	1.00	0.90	1.33	1.05	98	0.69	68	19.64	3.55	1.08	76	NL	1.00	0.85	0.60	0.74	5.00	NL	0.57	0.182	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	462.74	224.93	54	1.00	0.90	1.33	1.05	68	0.67	45	73.39	0.50	1.20	55	NL	1.00	0.85	0.60	0.72	6.00	NL	0.53	0.169	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	493.19	240.67	61	1.00	0.90	1.33	1.05	77	0.64	49	76.47	0.50	1.20	60	NL	1.00	0.85	0.60	0.70	7.00	NL	0.49	0.156	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	523.64	256.41	55	1.00	0.90	1.33	1.05	69	0.62	43	74.75	0.50	1.20	52	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.142	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	559.16	274.77	68	1.00	0.90	1.33	1.05	85	0.60	52	89.17	0.50	1.20	62	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.127	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	579.46	285.26	76	1.00	0.90	1.33	1.05	96	0.59	57	89.17	0.50	1.20	68	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.116	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-69
Chainage	7+329

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Greyish, fine-grained silty sand (SM)	0.00	9.25	16.77	6.96
2	Very Stiff to Hard, Brownish to Yellow, fine-grained inorganic silt of low P	9.25	13.00	19.22	9.41
3	Very Dense Greyish, fine-grained silty sand (SM)	13.00	22.00	19.90	10.09
4	Very Dense, Brownish Red, fine-grained inorganic silt of low Plasticity wi	22.00	30.00	19.90	10.09

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (Dr)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.00	2.50	1.25	20.96	8.70	11	0.75	0.90	1.33	1.05	10	1.70	18	67.88	0.50	1.20	22	0.24	1.00	0.19	0.80	1.63	1.00	0.39	0.99	0.372	1.04	Liquefiable Soil
2	2.50	4.00	3.25	54.50	22.63	13	0.80	0.90	1.33	1.05	13	1.70	22	26.88	4.47	1.13	30	0.44	1.00	0.23	0.80	1.35	1.00	0.59	0.98	0.366	1.62	Non Liquefiable Soil
3	4.00	5.50	4.75	79.66	33.08	17	0.85	0.90	1.33	1.05	18	1.70	31	34.71	4.96	1.19	42	NL	1.00	0.31	0.80	1.25	1.00	NL	0.96	0.362	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	104.81	43.52	22	0.95	0.90	1.33	1.05	26	1.52	40	18.03	3.24	1.07	46	NL	1.00	0.43	0.78	1.20	1.00	NL	0.95	0.358	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	129.97	53.97	30	0.95	0.90	1.33	1.05	36	1.36	49	32.77	4.87	1.18	62	NL	1.00	0.58	0.71	1.20	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	155.12	64.41	20	0.95	0.90	1.33	1.05	24	1.25	30	69.15	0.50	1.20	36	NL	1.00	0.40	0.80	1.09	1.00	NL	0.93	0.349	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	183.95	78.53	27	1.00	0.90	1.33	1.05	34	1.13	38	69.30	0.50	1.20	46	NL	1.00	0.55	0.72	1.07	1.00	NL	0.89	0.324	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.78	92.65	31	1.00	0.90	1.33	1.05	39	1.04	40	29.15	4.65	1.15	51	NL	1.00	0.63	0.68	1.02	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	242.12	107.28	34	1.00	0.90	1.33	1.05	43	0.97	41	31.37	4.79	1.17	53	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.284	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.97	122.42	56	1.00	0.90	1.33	1.05	70	0.90	64	24.37	4.22	1.11	75	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.266	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	301.82	137.56	65	1.00	0.90	1.33	1.05	82	0.85	70	27.82	4.55	1.14	84	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.249	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	331.67	152.70	69	1.00	0.90	1.33	1.05	87	0.81	70	31.76	4.81	1.17	87	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	361.52	167.84	73	1.00	0.90	1.33	1.05	92	0.77	71	33.48	4.91	1.18	89	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.217	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	391.37	182.98	46	1.00	0.90	1.33	1.05	58	0.74	43	75.00	0.50	1.20	52	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.202	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	421.22	198.12	52	1.00	0.90	1.33	1.05	65	0.71	46	95.03	0.50	1.20	56	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	451.07	213.26	56	1.00	0.90	1.33	1.05	70	0.68	48	76.77	0.50	1.20	58	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.92	228.40	61	1.00	0.90	1.33	1.05	77	0.66	51	86.29	0.50	1.20	61	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	510.77	243.54	67	1.00	0.90	1.33	1.05	84	0.64	54	74.80	0.50	1.20	65	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	545.60	261.20	73	1.00	0.90	1.33	1.05	92	0.62	57	87.73	0.50	1.20	69	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	565.50	271.30	77	1.00	0.90	1.33	1.05	97	0.61	59	87.73	0.50	1.20	71	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.119	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-69A
Chainage	7+392

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose Dense to Medium Dense, Greyish, fine-grained silty sand (SM)	0.00	8.25	16.77	6.96
2	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticity	8.25	14.25	19.22	9.41
3	Dense to Very Dense, Greyish, fine-grained silty sand (SM)	14.25	23.25	17.65	7.84
4	Very Stiff to Hard, Brownish Red to Yellow, fine-grained inorganic silt of l	23.25	30.00	20.20	10.39

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.96	8.70	10	0.75	0.90	1.33	1.05	9	1.70	16	33.78	4.92	1.19	24	0.27	1.00	0.17	0.80	1.63	1.00	0.44	0.99	0.372	1.19	Liquefiable Soil
2	2.50	4.00	3.25	54.50	22.63	24	0.80	0.90	1.33	1.05	24	1.70	41	16.52	2.90	1.06	46	NL	1.00	0.40	0.80	1.35	1.00	NL	0.98	0.366	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	79.66	33.08	26	0.85	0.90	1.33	1.05	28	1.70	47	22.49	3.99	1.10	56	NL	1.00	0.46	0.77	1.29	1.00	NL	0.96	0.362	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	104.81	43.52	31	0.95	0.90	1.33	1.05	37	1.52	56	89.10	0.50	1.20	68	NL	1.00	0.60	0.70	1.29	1.00	NL	0.95	0.358	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	129.97	53.97	35	0.95	0.90	1.33	1.05	42	1.36	57	73.58	0.50	1.20	69	NL	1.00	0.85	0.60	1.28	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.57	66.86	26	0.95	0.90	1.33	1.05	31	1.22	38	73.58	0.50	1.20	46	NL	1.00	0.51	0.75	1.11	1.00	NL	0.93	0.342	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.40	80.98	29	1.00	0.90	1.33	1.05	36	1.11	41	81.92	0.50	1.20	49	NL	1.00	0.59	0.70	1.06	1.00	NL	0.89	0.318	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.23	95.10	38	1.00	0.90	1.33	1.05	48	1.03	49	75.44	0.50	1.20	59	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.299	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.06	109.22	43	1.00	0.90	1.33	1.05	54	0.96	52	23.94	4.17	1.11	61	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.281	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.32	121.77	46	1.00	0.90	1.33	1.05	58	0.91	52	25.49	4.34	1.12	63	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.267	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	297.80	133.54	58	1.00	0.90	1.33	1.05	73	0.87	63	56.10	0.50	1.20	76	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.253	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	324.27	145.30	61	1.00	0.90	1.33	1.05	77	0.83	64	19.26	3.48	1.07	72	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.239	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	350.75	157.07	64	1.00	0.90	1.33	1.05	80	0.80	64	31.60	4.81	1.17	80	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.225	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	377.22	168.83	64	1.00	0.90	1.33	1.05	80	0.77	62	29.55	4.68	1.15	76	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.211	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	403.70	180.60	72	1.00	0.90	1.33	1.05	90	0.74	67	96.00	0.50	1.20	81	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.198	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	432.72	194.91	27	1.00	0.90	1.33	1.05	34	0.72	24	66.67	0.50	1.20	30	0.45	1.00	0.55	0.72	0.83	6.00	2.22	0.53	0.182	12.19	Non Liquefiable Soil
17	25.00	26.50	25.75	463.02	210.50	37	1.00	0.90	1.33	1.05	47	0.69	32	73.24	0.50	1.20	39	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.167	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	493.32	226.09	43	1.00	0.90	1.33	1.05	54	0.67	36	69.68	0.50	1.20	44	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.152	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	528.67	244.28	53	1.00	0.90	1.33	1.05	67	0.64	43	43.14	0.50	1.20	52	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.135	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	548.87	254.67	100	1.00	0.90	1.33	1.05	126	0.63	79	43.14	0.50	1.20	95	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-69B
Chainage	7+369

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose Dense to Medium Dense, Greyish, fine-grained silty sand (SM)	0.00	8.25	16.77	6.96
2	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticity	8.25	14.25	19.22	9.41
3	Dense to Very Dense, Greyish, fine-grained silty sand (SM)	14.25	23.25	17.65	7.84
4	Very Stiff to Hard, Brownish Red to Yellow, fine-grained inorganic silt of l	23.25	30.00	19.22	9.41

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.96	8.70	7	0.75	0.90	1.33	1.05	7	1.70	11	36.38	0.50	1.20	14	0.15	1.00	0.10	0.80	1.63	1.00	0.24	0.99	0.372	0.66	Liquefiable Soil
2	2.50	4.00	3.25	54.50	22.63	9	0.80	0.90	1.33	1.05	9	1.70	15	36.56	0.50	1.20	19	0.20	1.00	0.17	0.80	1.35	1.00	0.27	0.98	0.366	0.75	Liquefiable Soil
3	4.00	5.50	4.75	79.66	33.08	9	0.85	0.90	1.33	1.05	10	1.70	16	26.55	4.44	1.13	23	0.25	1.00	0.17	0.80	1.25	1.00	0.32	0.96	0.362	0.88	Liquefiable Soil
4	5.50	7.00	6.25	104.81	43.52	13	0.95	0.90	1.33	1.05	16	1.52	24	73.22	0.50	1.20	29	0.40	1.00	0.27	0.80	1.18	1.00	0.47	0.95	0.358	1.31	Non Liquefiable Soil
5	7.00	8.50	7.75	129.97	53.97	14	0.95	0.90	1.33	1.05	17	1.36	23	62.40	0.50	1.20	28	0.36	1.00	0.28	0.80	1.13	1.00	0.41	0.94	0.353	1.16	Liquefiable Soil
6	8.50	10.00	9.25	157.57	66.86	19	0.95	0.90	1.33	1.05	23	1.22	28	62.38	0.50	1.20	34	NL	1.00	0.38	0.80	1.08	1.00	NL	0.93	0.342	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.40	80.98	25	1.00	0.90	1.33	1.05	31	1.11	35	32.80	4.87	1.18	46	NL	1.00	0.51	0.74	1.06	1.00	NL	0.89	0.318	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.23	95.10	27	1.00	0.90	1.33	1.05	34	1.03	35	13.47	2.04	1.04	38	NL	1.00	0.55	0.72	1.01	1.00	NL	0.85	0.299	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.06	109.22	29	1.00	0.90	1.33	1.05	36	0.96	35	16.12	2.80	1.05	40	NL	1.00	0.59	0.70	0.97	1.00	NL	0.81	0.281	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.32	121.77	54	1.00	0.90	1.33	1.05	68	0.91	62	17.80	3.19	1.07	69	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.267	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	297.80	133.54	59	1.00	0.90	1.33	1.05	74	0.87	64	76.47	0.50	1.20	78	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.253	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	324.27	145.30	66	1.00	0.90	1.33	1.05	83	0.83	69	62.15	0.50	1.20	83	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.239	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	350.75	157.07	72	1.00	0.90	1.33	1.05	90	0.80	72	88.88	0.50	1.20	87	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.225	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	377.22	168.83	82	1.00	0.90	1.33	1.05	103	0.77	79	82.76	0.50	1.20	96	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.211	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	403.70	180.60	100	1.00	0.90	1.33	1.05	126	0.74	94	19.98	3.61	1.08	105	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.198	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	431.74	193.93	82	1.00	0.90	1.33	1.05	103	0.72	74	57.54	0.50	1.20	89	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.183	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	460.57	208.05	87	1.00	0.90	1.33	1.05	109	0.69	76	25.94	4.38	1.12	89	NL	1.00	0.85	0.60	0.75	7.00	NL	0.49	0.168	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	489.40	222.17	100	1.00	0.90	1.33	1.05	126	0.67	84	45.14	0.50	1.20	102	NL	1.00	0.85	0.60	0.73	8.00	NL	0.45	0.153	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	523.04	238.64	100	1.00	0.90	1.33	1.05	126	0.65	81	52.74	0.50	1.20	98	NL	1.00	0.85	0.60	0.71	9.00	NL	0.40	0.137	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	542.26	248.06	100	1.00	0.90	1.33	1.05	126	0.63	80	52.74	0.50	1.20	96	NL	1.00	0.85	0.60	0.70	10.00	NL	0.37	0.125	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-70
Chainage	7+487

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose Dense to Medium Dense, Brownish Gray, fine-grained silty sand (	0.00	8.25	16.77	6.96
2	Very Stiff to Hard, Whitish Grey to Brownish Grey, fine-grained inorganic	8.25	14.25	19.22	9.41
3	Dense to Very Dense, Yellowish to Brownish Grey, fine-grained silty sand	14.25	20.25	17.65	7.84
4	Very Dense, Brownish Grey, fine-grained inorganic silt of low Plasticity w	20.25	30.00	19.22	9.41

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.96	8.70	9	0.75	0.90	1.33	1.05	8	1.70	14	19.64	3.55	1.08	19	0.20	1.00	0.16	0.80	1.63	1.00	0.33	0.99	0.372	0.89	Liquefiable Soil
2	2.50	4.00	3.25	54.50	22.63	9	0.80	0.90	1.33	1.05	9	1.70	15	19.64	3.55	1.08	20	0.22	1.00	0.17	0.80	1.35	1.00	0.29	0.98	0.366	0.80	Liquefiable Soil
3	4.00	5.50	4.75	79.66	33.08	10	0.85	0.90	1.33	1.05	11	1.70	18	28.37	4.59	1.14	25	0.30	1.00	0.19	0.80	1.25	1.00	0.37	0.96	0.362	1.03	Liquefiable Soil
4	5.50	7.00	6.25	104.81	43.52	11	0.95	0.90	1.33	1.05	13	1.52	20	95.67	0.50	1.20	24	0.28	1.00	0.23	0.80	1.18	1.00	0.33	0.95	0.358	0.93	Liquefiable Soil
5	7.00	8.50	7.75	129.97	53.97	16	0.95	0.90	1.33	1.05	19	1.36	26	71.14	0.50	1.20	32	NL	1.00	0.32	0.80	1.13	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.57	66.86	22	0.95	0.90	1.33	1.05	26	1.22	32	91.81	0.50	1.20	39	NL	1.00	0.43	0.78	1.09	1.00	NL	0.93	0.342	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.40	80.98	27	1.00	0.90	1.33	1.05	34	1.11	38	68.52	0.50	1.20	46	NL	1.00	0.55	0.72	1.06	1.00	NL	0.89	0.318	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.23	95.10	37	1.00	0.90	1.33	1.05	47	1.03	48	31.64	4.81	1.17	61	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.299	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.06	109.22	43	1.00	0.90	1.33	1.05	54	0.96	52	23.59	4.13	1.10	61	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.281	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.32	121.77	45	1.00	0.90	1.33	1.05	57	0.91	51	49.62	0.50	1.20	62	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.267	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	297.80	133.54	55	1.00	0.90	1.33	1.05	69	0.87	60	30.11	4.71	1.16	74	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.253	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	324.27	145.30	67	1.00	0.90	1.33	1.05	84	0.83	70	80.82	0.50	1.20	84	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.239	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	350.75	157.07	74	1.00	0.90	1.33	1.05	93	0.80	74	77.55	0.50	1.20	90	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.225	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	378.79	170.40	76	1.00	0.90	1.33	1.05	96	0.77	73	82.10	0.50	1.20	88	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.210	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	407.62	184.52	100	1.00	0.90	1.33	1.05	126	0.74	93	75.23	0.50	1.20	112	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.195	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	436.45	198.64	54	1.00	0.90	1.33	1.05	68	0.71	48	73.36	0.50	1.20	58	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.180	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	465.28	212.76	60	1.00	0.90	1.33	1.05	75	0.69	52	71.72	0.50	1.20	63	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.166	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	494.11	226.88	79	1.00	0.90	1.33	1.05	99	0.66	66	60.16	0.50	1.20	80	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.152	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	527.75	243.35	100	1.00	0.90	1.33	1.05	126	0.64	81	45.14	0.50	1.20	97	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.135	NL	Non Liquefiable Soil
20	29.50	31.00	30.25	546.97	252.77	100	1.00	0.90	1.33	1.05	126	0.63	79	45.14	0.50	1.20	95	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

B.9. Zone 9: CH: 7+490 km to 8+550 km (BH-71 to BH-80)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-71	0.00	2.50	5	5	8	14	0.24	0.36	0.66	Liquefiable Soil
BH-71	2.50	4.00	7	7	12	15	0.21	0.36	0.59	Liquefiable Soil
BH-71	4.00	5.50	10	11	18	24	0.35	0.35	0.98	Liquefiable Soil
BH-72	0.00	2.50	6	6	10	16	0.27	0.36	0.74	Liquefiable Soil
BH-72	2.50	4.00	9	9	15	22	0.32	0.36	0.91	Liquefiable Soil
BH-72	4.00	5.50	9	10	16	23	0.32	0.35	0.92	Liquefiable Soil
BH-73	0.00	2.50	7	7	11	17	0.29	0.36	0.81	Liquefiable Soil
BH-73	2.50	4.00	9	9	15	20	0.29	0.36	0.80	Liquefiable Soil
BH-73	4.00	5.50	9	10	16	21	0.28	0.35	0.80	Liquefiable Soil
BH-74	0.00	2.50	6	6	10	16	0.27	0.36	0.75	Liquefiable Soil
BH-74	2.50	4.00	8	8	14	20	0.29	0.36	0.83	Liquefiable Soil
BH-75	0.00	2.50	7	7	11	14	0.24	0.36	0.67	Liquefiable Soil
BH-75	14.50	16.00	18	23	21	27	0.33	0.28	1.20	Liquefiable Soil
BH-76	0.00	2.50	5	5	8	14	0.25	0.36	0.68	Liquefiable Soil
BH-76	2.50	4.00	8	8	14	17	0.24	0.36	0.67	Liquefiable Soil
BH-76	4.00	5.50	10	11	18	26	0.39	0.35	1.11	Liquefiable Soil
BH-77	0.00	2.50	6	6	10	16	0.27	0.34	0.78	Liquefiable Soil
BH-77	4.00	5.50	12	13	21	26	0.37	0.33	1.11	Liquefiable Soil
BH-77	5.50	7.00	13	16	22	27	0.38	0.33	1.15	Liquefiable Soil
BH-80	0.00	2.50	6	6	10	12	0.21	0.36	0.59	Liquefiable Soil
BH-80	2.50	4.00	7	7	12	15	0.21	0.36	0.59	Liquefiable Soil
BH-80	4.00	5.50	9	10	16	20	0.27	0.35	0.76	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-71
Chainage	7+629

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand and gravel (SM)	0.00	6.25	17.10	7.29
2	Very Stiff to Hard, Brownish Grey, fine-grained inorganic silt of low Plast	6.25	11.25	19.40	9.59
3	Very Dense, Brownish Grey to Yellowish, fine-grained silty sand and grav	11.25	18.25	20.00	10.19
4	Very Dense, Yellowish to Brownish, fine-grained silty sand and gravel (SM	18.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	5	0.75	0.90	1.33	1.05	5	1.70	8	29.0	4.64	1.15	14	0.15	1.00	0.03	0.80	1.61	1.00	0.24	0.99	0.362	0.66	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	7	0.80	0.90	1.33	1.05	7	1.70	12	74.7	0.50	1.20	15	0.16	1.00	0.11	0.80	1.33	1.00	0.21	0.98	0.357	0.59	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	10	0.85	0.90	1.33	1.05	11	1.70	18	24.3	4.21	1.11	24	0.28	1.00	0.19	0.80	1.24	1.00	0.35	0.96	0.352	0.98	Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	16	0.95	0.90	1.33	1.05	19	1.48	28	24.3	4.21	1.11	36	NL	1.00	0.32	0.80	1.17	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	135.98	59.97	20	0.95	0.90	1.33	1.05	24	1.29	31	76.3	0.50	1.20	38	NL	1.00	0.40	0.80	1.11	1.00	NL	0.94	0.333	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	165.08	74.36	28	0.95	0.90	1.33	1.05	33	1.16	39	58.3	0.50	1.20	47	NL	1.00	0.55	0.73	1.08	1.00	NL	0.93	0.322	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	194.18	88.75	32	1.00	0.90	1.33	1.05	40	1.06	43	75.2	0.50	1.20	52	NL	1.00	0.85	0.60	1.05	1.00	NL	0.89	0.303	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	223.88	103.74	40	1.00	0.90	1.33	1.05	50	0.98	49	19.5	3.53	1.08	57	NL	1.00	0.85	0.60	0.99	1.00	NL	0.85	0.285	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	253.88	119.03	51	1.00	0.90	1.33	1.05	64	0.92	59	19.5	3.53	1.08	67	NL	1.00	0.85	0.60	0.93	1.00	NL	0.81	0.268	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	283.88	134.32	66	1.00	0.90	1.33	1.05	83	0.86	72	27.2	4.50	1.13	86	NL	1.00	0.85	0.60	0.89	1.00	NL	0.77	0.253	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	313.88	149.61	65	1.00	0.90	1.33	1.05	82	0.82	67	29.3	4.66	1.15	81	NL	1.00	0.85	0.60	0.85	1.00	NL	0.73	0.238	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	343.88	164.90	72	1.00	0.90	1.33	1.05	90	0.78	70	22.7	4.02	1.10	81	NL	1.00	0.85	0.60	0.82	2.00	NL	0.69	0.223	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	373.88	180.19	76	1.00	0.90	1.33	1.05	96	0.74	71	21.1	3.79	1.09	81	NL	1.00	0.85	0.60	0.79	3.00	NL	0.65	0.209	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	403.88	195.48	80	1.00	0.90	1.33	1.05	101	0.72	72	20.9	3.77	1.09	82	NL	1.00	0.85	0.60	0.76	4.00	NL	0.61	0.196	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	433.88	210.77	89	1.00	0.90	1.33	1.05	112	0.69	77	31.3	4.78	1.16	95	NL	1.00	0.85	0.60	0.74	5.00	NL	0.57	0.182	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	463.88	226.06	100	1.00	0.90	1.33	1.05	126	0.67	84	58.2	0.50	1.20	101	NL	1.00	0.85	0.60	0.72	6.00	NL	0.53	0.169	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	493.88	241.35	100	1.00	0.90	1.33	1.05	126	0.64	81	24.2	4.20	1.11	94	NL	1.00	0.85	0.60	0.70	7.00	NL	0.49	0.155	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	523.88	256.64	100	1.00	0.90	1.33	1.05	126	0.62	78	17.3	3.09	1.06	86	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.142	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	558.88	274.48	100	1.00	0.90	1.33	1.05	126	0.60	76	20.7	3.73	1.08	86	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.127	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	578.88	284.68	100	1.00	0.90	1.33	1.05	126	0.59	74	16.3	2.85	1.06	82	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.118	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-72
Chainage	7+728

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Whiteish to Brownish, fine-grained silty sand (SM)	0.00	5.25	17.10	7.29
2	Medium Dense to Dense, Brownish gray to yellowish, fine-grained sil	5.25	13.00	17.45	7.64
3	Very Dense, yellowish Brownish to Brownish, fine-grained silty sand	13.00	23.25	20.00	10.19
4	Hard, yellowish, fine-grained inorganic silt of low Plasticity with sand	23.25	26.25	19.40	9.59
5	Very Dense, Brownish, fine-grained silty sand and gravel (SM)	26.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	6	0.75	0.90	1.33	1.05	6	1.70	10	28.0	4.56	1.14	16	0.17	1.00	0.06	0.80	1.61	1.00	0.27	0.99	0.362	0.74	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	9	0.80	0.90	1.33	1.05	9	1.70	15	28.0	4.56	1.14	22	0.24	1.00	0.17	0.80	1.33	1.00	0.32	0.98	0.357	0.91	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	9	0.85	0.90	1.33	1.05	10	1.70	16	28.8	4.62	1.14	23	0.26	1.00	0.17	0.80	1.24	1.00	0.32	0.96	0.352	0.92	Liquefiable Soil
4	5.50	7.00	6.25	107.23	45.93	21	0.95	0.90	1.33	1.05	25	1.48	37	28.8	4.62	1.14	47	NL	1.00	0.41	0.79	1.17	1.00	NL	0.95	0.347	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.40	57.40	33	0.95	0.90	1.33	1.05	39	1.32	52	31.8	4.81	1.17	66	NL	1.00	0.64	0.68	1.19	1.00	NL	0.94	0.341	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.58	68.86	38	0.95	0.90	1.33	1.05	45	1.21	55	35.1	0.50	1.20	66	NL	1.00	0.85	0.60	1.16	1.00	NL	0.93	0.336	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.75	80.33	45	1.00	0.90	1.33	1.05	57	1.12	63	19.6	3.55	1.08	72	NL	1.00	0.85	0.60	1.09	1.00	NL	0.89	0.320	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.93	91.79	50	1.00	0.90	1.33	1.05	63	1.04	66	22.9	4.05	1.10	76	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.305	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	240.01	105.17	54	1.00	0.90	1.33	1.05	68	0.98	66	26.4	4.43	1.13	79	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.287	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	270.01	120.46	57	1.00	0.90	1.33	1.05	72	0.91	65	18.9	3.41	1.07	73	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	300.01	135.75	59	1.00	0.90	1.33	1.05	74	0.86	64	29.1	4.64	1.15	78	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.01	151.04	67	1.00	0.90	1.33	1.05	84	0.81	69	29.8	4.69	1.15	84	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.01	166.33	74	1.00	0.90	1.33	1.05	93	0.78	72	25.0	4.29	1.12	85	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.01	181.62	76	1.00	0.90	1.33	1.05	96	0.74	71	37.9	0.50	1.20	86	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.01	196.91	84	1.00	0.90	1.33	1.05	106	0.71	75	28.4	4.59	1.14	90	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	449.41	211.60	54	1.00	0.90	1.33	1.05	68	0.69	47	97.6	0.50	1.20	56	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	478.51	225.99	60	1.00	0.90	1.33	1.05	75	0.67	50	72.3	0.50	1.20	61	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.161	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	508.21	240.98	87	1.00	0.90	1.33	1.05	109	0.64	70	38.7	0.50	1.20	85	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	543.21	258.82	100	1.00	0.90	1.33	1.05	126	0.62	78	22.7	4.02	1.10	90	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	563.21	269.01	100	1.00	0.90	1.33	1.05	126	0.61	77	38.1	0.50	1.20	92	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.122	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-73
Chainage	7+837

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose Whiteish to Brownish, fine-grained silty sand and gravel (SM)	0.00	6.25	17.10	7.29
2	Medium Dense, Brownish Grey to yellowish, fine-grained silty sand a	6.25	11.25	17.45	7.64
3	Dense, yellowish to Brownish, fine-grained silty sand and Gravel (SM	11.25	15.25	19.00	9.19
4	Very Dense, Brownish to yellowish, fine-grained silty sand and gravel	15.25	26.25	20.00	10.19
5	Dense to Very dense, yellowish, fine-grained silty sand and gravel (S	26.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	7	0.75	0.90	1.33	1.05	7	1.70	11	27.1	4.49	1.13	17	0.18	1.00	0.10	0.80	1.61	1.00	0.29	0.99	0.362	0.81	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	9	0.80	0.90	1.33	1.05	9	1.70	15	18.9	3.41	1.07	20	0.21	1.00	0.17	0.80	1.33	1.00	0.29	0.98	0.357	0.80	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	9	0.85	0.90	1.33	1.05	10	1.70	16	18.9	3.41	1.07	21	0.23	1.00	0.17	0.80	1.24	1.00	0.28	0.96	0.352	0.80	Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	16	0.95	0.90	1.33	1.05	19	1.48	28	26.9	4.47	1.13	36	NL	1.00	0.32	0.80	1.17	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.05	57.05	19	0.95	0.90	1.33	1.05	23	1.32	30	13.2	1.96	1.04	33	NL	1.00	0.38	0.80	1.12	1.00	NL	0.94	0.342	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.23	68.51	20	0.95	0.90	1.33	1.05	24	1.21	29	27.8	4.54	1.14	37	NL	1.00	0.40	0.80	1.08	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.40	79.98	23	1.00	0.90	1.33	1.05	29	1.12	32	30.8	4.76	1.16	42	NL	1.00	0.47	0.76	1.05	1.00	NL	0.89	0.321	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	213.13	92.99	31	1.00	0.90	1.33	1.05	39	1.04	40	21.6	3.87	1.09	48	NL	1.00	0.63	0.68	1.02	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.63	106.78	42	1.00	0.90	1.33	1.05	53	0.97	51	21.6	3.87	1.09	60	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	270.13	120.57	54	1.00	0.90	1.33	1.05	68	0.91	62	19.5	3.53	1.08	70	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	300.13	135.86	58	1.00	0.90	1.33	1.05	73	0.86	63	24.2	4.21	1.11	74	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.250	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.13	151.15	65	1.00	0.90	1.33	1.05	82	0.81	66	27.9	4.55	1.14	80	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.13	166.44	70	1.00	0.90	1.33	1.05	88	0.78	68	21.7	3.88	1.09	78	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.13	181.73	77	1.00	0.90	1.33	1.05	97	0.74	72	27.4	4.51	1.13	86	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.13	197.02	82	1.00	0.90	1.33	1.05	103	0.71	73	33.9	4.93	1.19	92	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	450.13	212.31	54	1.00	0.90	1.33	1.05	68	0.69	47	22.3	3.97	1.10	55	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.13	227.60	60	1.00	0.90	1.33	1.05	75	0.66	50	26.2	4.41	1.12	61	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	509.63	242.39	31	1.00	0.90	1.33	1.05	39	0.64	25	20.5	3.70	1.08	31	NL	1.00	0.63	0.68	0.76	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	543.75	259.36	41	1.00	0.90	1.33	1.05	52	0.62	32	33.5	4.91	1.18	43	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	563.25	269.05	100	1.00	0.90	1.33	1.05	126	0.61	77	28.5	4.60	1.14	92	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.122	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-74
Chainage	7+912

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	4.00	17.10	7.29
2	Medium Dense, Brownish Grey, fine-grained silty sand and gravel (SM	4.00	9.25	17.45	7.64
3	Very Stiff to Hard, Brownish to Whiteish, fine-grained inorganic silt of	9.25	14.25	19.40	9.59
4	Very Dense, Whiteish to Brownish Grey, fine-grained silty sand and g	14.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	6	0.75	0.90	1.33	1.05	6	1.70	10	29.8	4.69	1.15	16	0.17	1.00	0.06	0.80	1.61	1.00	0.27	0.99	0.362	0.75	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	8	0.80	0.90	1.33	1.05	8	1.70	14	29.8	4.69	1.15	20	0.22	1.00	0.15	0.80	1.33	1.00	0.29	0.98	0.357	0.83	Liquefiable Soil
3	4.00	5.50	4.75	81.49	34.91	14	0.85	0.90	1.33	1.05	15	1.69	25	29.9	4.70	1.15	34	NL	1.00	0.26	0.80	1.23	1.00	NL	0.96	0.351	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	107.66	46.37	21	0.95	0.90	1.33	1.05	25	1.47	37	29.9	4.70	1.15	47	NL	1.00	0.41	0.79	1.17	1.00	NL	0.95	0.345	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.84	57.84	27	0.95	0.90	1.33	1.05	32	1.31	42	29.7	4.69	1.15	54	NL	1.00	0.53	0.74	1.16	1.00	NL	0.94	0.340	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	160.01	69.30	31	0.95	0.90	1.33	1.05	37	1.20	44	61.4	0.50	1.20	54	NL	1.00	0.60	0.70	1.12	1.00	NL	0.93	0.335	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	189.11	83.69	36	1.00	0.90	1.33	1.05	45	1.09	49	75.9	0.50	1.20	60	NL	1.00	0.85	0.60	1.07	1.00	NL	0.89	0.313	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.21	98.08	41	1.00	0.90	1.33	1.05	52	1.01	52	55.9	0.50	1.20	63	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.294	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.31	112.47	45	1.00	0.90	1.33	1.05	57	0.94	53	66.7	0.50	1.20	64	NL	1.00	0.85	0.60	0.95	1.00	NL	0.81	0.277	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	277.01	127.46	55	1.00	0.90	1.33	1.05	69	0.89	61	28.3	4.59	1.14	74	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.260	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	307.01	142.75	62	1.00	0.90	1.33	1.05	78	0.84	65	28.3	4.59	1.14	79	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.244	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	337.01	158.04	69	1.00	0.90	1.33	1.05	87	0.80	69	65.6	0.50	1.20	83	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.228	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	367.01	173.33	33	1.00	0.90	1.33	1.05	41	0.76	32	27.1	4.49	1.13	40	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.214	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	397.01	188.62	100	1.00	0.90	1.33	1.05	126	0.73	92	66.3	0.50	1.20	110	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.199	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	427.01	203.91	100	1.00	0.90	1.33	1.05	126	0.70	88	23.6	4.13	1.10	101	NL	1.00	0.85	0.60	0.75	5.00	NL	0.57	0.185	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	457.01	219.20	100	1.00	0.90	1.33	1.05	126	0.68	85	63.0	0.50	1.20	102	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.171	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	487.01	234.49	100	1.00	0.90	1.33	1.05	126	0.65	82	31.9	4.82	1.17	101	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	517.01	249.78	100	1.00	0.90	1.33	1.05	126	0.63	80	65.0	0.50	1.20	96	NL	1.00	0.85	0.60	0.69	8.00	NL	0.45	0.144	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	552.01	267.62	100	1.00	0.90	1.33	1.05	126	0.61	77	30.2	4.72	1.16	93	NL	1.00	0.85	0.60	0.67	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	572.01	277.81	100	1.00	0.90	1.33	1.05	126	0.60	75	24.7	4.25	1.11	88	NL	1.00	0.85	0.60	0.66	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-75
Chainage	8+031

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Brownish Grey, fine-grained inorganic silt of low	0.00	7.00	17.10	7.29
2	Medium Dense, Whiteish Grey to Brownish Grey, fine-grained silty s	7.00	20.25	17.45	7.64
3	Dense to Very Dense, Whiteish Brown to Brownish Grey, fine-grained	20.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	7	0.75	0.90	1.33	1.05	7	1.70	11	71.3	0.50	1.20	14	0.15	1.00	0.10	0.80	1.61	1.00	0.24	0.99	0.362	0.67	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	13	0.80	0.90	1.33	1.05	13	1.70	22	71.3	0.50	1.20	27	0.34	1.00	0.23	0.80	1.33	1.00	0.46	0.98	0.357	1.28	Non Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	14	0.85	0.90	1.33	1.05	15	1.70	25	74.5	0.50	1.20	31	NL	1.00	0.26	0.80	1.24	1.00	NL	0.96	0.352	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.88	45.58	16	0.95	0.90	1.33	1.05	19	1.48	28	74.5	0.50	1.20	34	NL	1.00	0.32	0.80	1.17	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.79	56.79	21	0.95	0.90	1.33	1.05	25	1.33	33	23.3	4.09	1.10	41	NL	1.00	0.41	0.79	1.12	1.00	NL	0.94	0.343	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.96	68.25	18	0.95	0.90	1.33	1.05	21	1.21	26	36.0	0.50	1.20	32	NL	1.00	0.36	0.80	1.08	1.00	NL	0.93	0.338	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.14	79.72	22	1.00	0.90	1.33	1.05	28	1.12	31	22.5	3.99	1.10	38	NL	1.00	0.46	0.77	1.05	1.00	NL	0.89	0.321	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.31	91.18	26	1.00	0.90	1.33	1.05	33	1.05	34	32.5	4.86	1.18	45	NL	1.00	0.53	0.73	1.02	1.00	NL	0.85	0.306	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	237.49	102.65	30	1.00	0.90	1.33	1.05	38	0.99	37	25.5	4.34	1.12	46	NL	1.00	0.61	0.69	0.99	1.00	NL	0.81	0.291	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	263.66	114.11	18	1.00	0.90	1.33	1.05	23	0.94	21	21.9	3.91	1.09	27	0.34	1.00	0.38	0.80	0.97	1.00	0.33	0.77	0.276	1.20	Liquefiable Soil
11	16.00	17.50	16.75	289.84	125.58	22	1.00	0.90	1.33	1.05	28	0.89	25	26.4	4.42	1.13	32	NL	1.00	0.46	0.77	0.95	1.00	NL	0.73	0.262	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	316.01	137.04	26	1.00	0.90	1.33	1.05	33	0.85	28	18.8	3.40	1.07	33	NL	1.00	0.53	0.73	0.92	2.00	NL	0.69	0.247	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	342.19	148.51	30	1.00	0.90	1.33	1.05	38	0.82	31	28.3	4.58	1.14	40	NL	1.00	0.61	0.69	0.89	3.00	NL	0.65	0.232	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	370.41	162.02	34	1.00	0.90	1.33	1.05	43	0.79	34	23.6	4.14	1.10	41	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.216	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	399.66	176.56	39	1.00	0.90	1.33	1.05	49	0.75	37	26.1	4.40	1.12	46	NL	1.00	0.85	0.60	0.80	5.00	NL	0.57	0.200	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	428.91	191.10	39	1.00	0.90	1.33	1.05	49	0.72	35	23.7	4.15	1.11	43	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.184	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	458.16	205.64	46	1.00	0.90	1.33	1.05	58	0.70	40	26.5	4.43	1.13	50	NL	1.00	0.85	0.60	0.75	7.00	NL	0.49	0.169	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	487.41	220.18	44	1.00	0.90	1.33	1.05	55	0.67	37	23.1	4.06	1.10	45	NL	1.00	0.85	0.60	0.73	8.00	NL	0.45	0.154	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	521.54	237.14	46	1.00	0.90	1.33	1.05	58	0.65	38	27.0	4.48	1.13	47	NL	1.00	0.85	0.60	0.71	9.00	NL	0.40	0.137	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	541.04	246.84	52	1.00	0.90	1.33	1.05	65	0.64	42	25.5	4.34	1.12	51	NL	1.00	0.85	0.60	0.70	10.00	NL	0.37	0.128	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-76
Chainage	8+069

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	5.25	17.10	7.29
2	Medium Dense, Yellowish to Brownish, fine-grained silty sand and G	5.25	10.00	17.45	7.64
3	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with s	10.00	14.25	17.10	7.29
4	Dense, Brownish to Whiteish, fine-grained silty sand (SM)	14.25	18.25	19.00	9.19
5	Very Dense, Yellowish to Brownish, fine-grained silty sand and Gravel (S	18.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
Hammer Type Correction (C_{HT})		1.33
Borehole Diameter (mm)		150
Borehole Diameter Correction (C_{BD})		1.05
Hammer weight or hight of fall (C_{HW})		1.00
Sampler Correction (C_{SS})		0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	5	0.75	0.90	1.33	1.05	5	1.70	8	31.9	4.82	1.17	14	0.15	1.00	0.03	0.80	1.61	1.00	0.25	0.99	0.362	0.68	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	8	0.80	0.90	1.33	1.05	8	1.70	14	63.4	0.50	1.20	17	0.18	1.00	0.15	0.80	1.33	1.00	0.24	0.98	0.357	0.67	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	10	0.85	0.90	1.33	1.05	11	1.70	18	32.5	4.86	1.18	26	0.32	1.00	0.19	0.80	1.24	1.00	0.39	0.96	0.352	1.11	Liquefiable Soil
4	5.50	7.00	6.25	107.23	45.93	13	0.95	0.90	1.33	1.05	16	1.48	23	32.5	4.86	1.18	32	NL	1.00	0.27	0.80	1.17	1.00	NL	0.95	0.347	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.40	57.40	16	0.95	0.90	1.33	1.05	19	1.32	25	21.8	3.89	1.09	31	NL	1.00	0.32	0.80	1.12	1.00	NL	0.94	0.341	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.58	68.86	19	0.95	0.90	1.33	1.05	23	1.21	27	21.8	3.89	1.09	34	NL	1.00	0.38	0.80	1.08	1.00	NL	0.93	0.336	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.49	80.07	22	1.00	0.90	1.33	1.05	28	1.12	31	68.7	0.50	1.20	38	NL	1.00	0.46	0.77	1.05	1.00	NL	0.89	0.321	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.14	91.01	26	1.00	0.90	1.33	1.05	33	1.05	34	24.4	4.22	1.11	42	NL	1.00	0.53	0.73	1.03	1.00	NL	0.85	0.307	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	236.79	101.95	32	1.00	0.90	1.33	1.05	40	0.99	40	70.1	0.50	1.20	48	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.292	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	264.34	114.79	40	1.00	0.90	1.33	1.05	50	0.93	47	63.8	0.50	1.20	57	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.275	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	292.84	128.58	44	1.00	0.90	1.33	1.05	55	0.88	49	20.3	3.67	1.08	56	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.258	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	321.34	142.37	57	1.00	0.90	1.33	1.05	72	0.84	60	25.0	4.29	1.12	71	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.242	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	351.34	157.66	66	1.00	0.90	1.33	1.05	83	0.80	66	20.8	3.74	1.08	75	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.225	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	381.34	172.95	71	1.00	0.90	1.33	1.05	89	0.76	68	30.5	4.74	1.16	83	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.209	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	411.34	188.24	76	1.00	0.90	1.33	1.05	96	0.73	70	29.7	4.69	1.15	85	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.193	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	441.34	203.53	100	1.00	0.90	1.33	1.05	126	0.70	88	82.3	0.50	1.20	106	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	471.34	218.82	100	1.00	0.90	1.33	1.05	126	0.68	85	26.1	4.40	1.12	100	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	501.34	234.11	100	1.00	0.90	1.33	1.05	126	0.65	82	60.3	0.50	1.20	99	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	536.34	251.94	100	1.00	0.90	1.33	1.05	126	0.63	79	21.2	3.81	1.09	90	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	556.34	262.14	100	1.00	0.90	1.33	1.05	126	0.62	78	51.5	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-77
Chainage	8+226

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish to Brownish Grey, fine-grained sil	0.00	7.00	17.86	8.05
2	Stiff to Very Stiff, Whiteish, fine-grained inorganic silt of low Plasticity	7.00	11.25	17.10	7.29
3	Medium Dense, Brownish, fine-grained silty sand (SM)	11.25	19.00	17.45	7.64
4	Dense, Brownish, fine-grained silty sand with Gravel (SM)	19.00	26.25	19.00	9.19
5	Very Dense, Brownish, fine-grained silty sand (SM)	26.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	22.33	10.07	6	0.75	0.90	1.33	1.05	6	1.70	10	29.9	4.70	1.15	16	0.17	1.00	0.06	0.80	1.58	1.00	0.27	0.99	0.343	0.78	Liquefiable Soil
2	2.50	4.00	3.25	58.05	26.17	11	0.80	0.90	1.33	1.05	11	1.70	19	29.9	4.70	1.15	26	0.32	1.00	0.20	0.80	1.31	1.00	0.42	0.98	0.337	1.25	Non Liquefiable Soil
3	4.00	5.50	4.75	84.84	38.25	12	0.85	0.90	1.33	1.05	13	1.62	21	19.1	3.46	1.07	26	0.31	1.00	0.22	0.80	1.21	1.00	0.37	0.96	0.333	1.11	Liquefiable Soil
4	5.50	7.00	6.25	111.63	50.33	13	0.95	0.90	1.33	1.05	16	1.41	22	38.4	0.50	1.20	27	0.33	1.00	0.27	0.80	1.15	1.00	0.38	0.95	0.329	1.15	Liquefiable Soil
5	7.00	8.50	7.75	137.85	61.84	16	0.95	0.90	1.33	1.05	19	1.27	24	68.9	0.50	1.20	30	0.45	1.00	0.32	0.80	1.10	1.00	0.49	0.94	0.327	1.50	Non Liquefiable Soil
6	8.50	10.00	9.25	163.50	72.78	21	0.95	0.90	1.33	1.05	25	1.17	29	89.4	0.50	1.20	36	NL	1.00	0.41	0.79	1.07	1.00	NL	0.93	0.326	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	189.15	83.72	23	1.00	0.90	1.33	1.05	29	1.09	32	67.5	0.50	1.20	38	NL	1.00	0.47	0.76	1.04	1.00	NL	0.89	0.313	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.15	95.01	25	1.00	0.90	1.33	1.05	31	1.03	32	39.4	0.50	1.20	39	NL	1.00	0.51	0.74	1.01	1.00	NL	0.85	0.299	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.32	106.48	29	1.00	0.90	1.33	1.05	36	0.97	35	24.2	4.20	1.11	43	NL	1.00	0.59	0.70	0.98	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	267.50	117.94	20	1.00	0.90	1.33	1.05	25	0.92	23	26.6	4.45	1.13	31	NL	1.00	0.42	0.79	0.97	1.00	NL	0.77	0.271	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	293.67	129.41	24	1.00	0.90	1.33	1.05	30	0.88	27	23.8	4.16	1.11	33	NL	1.00	0.49	0.75	0.94	1.00	NL	0.73	0.257	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	319.85	140.87	29	1.00	0.90	1.33	1.05	36	0.84	31	22.8	4.03	1.10	38	NL	1.00	0.59	0.70	0.90	2.00	NL	0.69	0.243	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	347.18	153.50	31	1.00	0.90	1.33	1.05	39	0.81	31	26.2	4.41	1.12	40	NL	1.00	0.63	0.68	0.87	3.00	NL	0.65	0.228	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	375.68	167.29	36	1.00	0.90	1.33	1.05	45	0.77	35	20.6	3.71	1.08	42	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.213	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	404.18	181.08	37	1.00	0.90	1.33	1.05	47	0.74	35	26.1	4.40	1.12	43	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.197	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	432.68	194.87	42	1.00	0.90	1.33	1.05	53	0.72	38	17.1	3.03	1.06	43	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.182	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	461.18	208.66	46	1.00	0.90	1.33	1.05	58	0.69	40	20.0	3.61	1.08	47	NL	1.00	0.85	0.60	0.75	7.00	NL	0.49	0.168	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	490.68	223.45	53	1.00	0.90	1.33	1.05	67	0.67	45	16.6	2.93	1.06	50	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.153	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	525.68	241.29	59	1.00	0.90	1.33	1.05	74	0.64	48	22.1	3.93	1.09	56	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.136	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	545.68	251.48	64	1.00	0.90	1.33	1.05	80	0.63	51	17.3	3.07	1.06	57	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.126	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-80
Chainage	8+551

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Brownish, fine-grained inorganic silt of low Plast	0.00	5.25	17.10	7.29
2	Medium Dense, Whiteish Grey, fine-grained silty sand and Gravel(SM	5.25	8.25	17.45	7.64
3	Very Stiff, Yellowish, fine-grained inorganic silt of low Plasticity with s	8.25	15.25	19.40	9.59
4	Hard, Brownish to Yellowish, fine-grained inorganic silt of low Plastici	15.25	20.25	19.40	9.59
5	Very Dense, Brownish, fine-grained silty sand (SM)	20.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	6	0.75	0.90	1.33	1.05	6	1.70	10	73.9	0.50	1.20	12	0.13	1.00	0.06	0.80	1.61	1.00	0.21	0.99	0.362	0.59	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	7	0.80	0.90	1.33	1.05	7	1.70	12	73.9	0.50	1.20	15	0.16	1.00	0.11	0.80	1.33	1.00	0.21	0.98	0.357	0.59	Liquefiable Soil
3	4.00	5.50	4.75	81.23	34.64	9	0.85	0.90	1.33	1.05	10	1.70	16	64.5	0.50	1.20	20	0.22	1.00	0.17	0.80	1.24	1.00	0.27	0.96	0.352	0.76	Liquefiable Soil
4	5.50	7.00	6.25	107.23	45.93	13	0.95	0.90	1.33	1.05	16	1.48	23	18.6	3.35	1.07	28	0.36	1.00	0.27	0.80	1.17	1.00	0.43	0.95	0.347	1.23	Non Liquefiable Soil
5	7.00	8.50	7.75	133.40	57.40	17	0.95	0.90	1.33	1.05	20	1.32	27	29.4	4.67	1.15	35	NL	1.00	0.34	0.80	1.12	1.00	NL	0.94	0.341	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	161.53	70.81	19	0.95	0.90	1.33	1.05	23	1.19	27	67.9	0.50	1.20	33	NL	1.00	0.38	0.80	1.07	1.00	NL	0.93	0.331	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	190.63	85.20	22	1.00	0.90	1.33	1.05	28	1.08	30	67.9	0.50	1.20	36	NL	1.00	0.46	0.77	1.04	1.00	NL	0.89	0.310	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	219.73	99.59	26	1.00	0.90	1.33	1.05	33	1.00	33	90.8	0.50	1.20	40	NL	1.00	0.53	0.73	1.00	1.00	NL	0.85	0.291	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	248.83	113.98	31	1.00	0.90	1.33	1.05	39	0.94	36	70.8	0.50	1.20	44	NL	1.00	0.63	0.68	0.96	1.00	NL	0.81	0.275	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	277.93	128.37	40	1.00	0.90	1.33	1.05	50	0.88	44	22.8	4.03	1.10	53	NL	1.00	0.85	0.60	0.90	1.00	NL	0.77	0.259	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	307.03	142.76	45	1.00	0.90	1.33	1.05	57	0.84	47	68.7	0.50	1.20	57	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.244	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	336.13	157.15	54	1.00	0.90	1.33	1.05	68	0.80	54	39.7	0.50	1.20	65	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.229	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	365.23	171.54	63	1.00	0.90	1.33	1.05	79	0.76	60	76.6	0.50	1.20	73	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.215	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	394.93	186.53	44	1.00	0.90	1.33	1.05	55	0.73	40	89.3	0.50	1.20	49	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	424.93	201.82	49	1.00	0.90	1.33	1.05	62	0.70	43	21.0	3.78	1.09	51	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.186	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	454.93	217.11	100	1.00	0.90	1.33	1.05	126	0.68	85	22.6	4.00	1.10	98	NL	1.00	0.85	0.60	0.73	6.00	NL	0.53	0.172	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	484.93	232.40	100	1.00	0.90	1.33	1.05	126	0.66	82	22.8	4.03	1.10	95	NL	1.00	0.85	0.60	0.71	7.00	NL	0.49	0.158	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	514.93	247.69	100	1.00	0.90	1.33	1.05	126	0.64	80	31.0	4.77	1.16	98	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.145	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	549.93	265.53	100	1.00	0.90	1.33	1.05	126	0.61	77	26.1	4.39	1.12	91	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.129	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	569.93	275.73	100	1.00	0.90	1.33	1.05	126	0.60	76	54.7	0.50	1.20	91	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.120	NL	Non Liquefiable Soil

B.10. Zone 10: CH: 8+550 km to 9+430 km (BH-82 to BH-89)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-82	0.00	2.50	7	7	11	17	0.30	0.38	0.79	Liquefiable Soil
BH-82	2.50	4.00	9	9	15	22	0.33	0.37	0.88	Liquefiable Soil
BH-82	4.00	5.50	11	12	20	25	0.37	0.36	1.00	Liquefiable Soil
BH-83	0.00	2.50	7	7	11	15	0.27	0.38	0.71	Liquefiable Soil
BH-83	2.50	4.00	9	9	15	20	0.29	0.37	0.78	Liquefiable Soil
BH-84	0.00	2.50	6	6	10	14	0.25	0.38	0.65	Liquefiable Soil
BH-84	2.50	4.00	7	7	12	16	0.23	0.37	0.63	Liquefiable Soil
BH-84	4.00	5.50	11	12	20	27	0.42	0.37	1.14	Liquefiable Soil
BH-84	5.50	7.00	10	12	18	25	0.35	0.37	0.96	Liquefiable Soil
BH-85	0.00	2.50	6	6	10	15	0.27	0.38	0.71	Liquefiable Soil
BH-85	2.50	4.00	8	8	14	20	0.29	0.37	0.78	Liquefiable Soil
BH-86	0.00	2.50	6	6	10	16	0.27	0.38	0.72	Liquefiable Soil
BH-86	2.50	4.00	7	7	12	18	0.26	0.37	0.71	Liquefiable Soil
BH-86	4.00	5.50	11	12	20	27	0.41	0.36	1.13	Liquefiable Soil
BH-87	0.00	2.50	7	7	11	17	0.29	0.36	0.81	Liquefiable Soil
BH-87	2.50	4.00	9	9	15	22	0.32	0.36	0.89	Liquefiable Soil
BH-88	0.00	2.50	6	6	10	15	0.27	0.38	0.70	Liquefiable Soil
BH-88	2.50	4.00	7	7	12	18	0.26	0.37	0.69	Liquefiable Soil
BH-88	4.00	5.50	9	10	16	23	0.33	0.37	0.88	Liquefiable Soil
BH-89	0.00	2.50	5	5	8	13	0.23	0.38	0.60	Liquefiable Soil
BH-89	2.50	4.00	7	7	12	17	0.25	0.37	0.67	Liquefiable Soil
BH-89	4.00	5.50	9	10	16	23	0.33	0.37	0.89	Liquefiable Soil
BH-89	5.50	7.00	11	13	20	28	0.42	0.36	1.17	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-82
Chainage	8+859

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Brownish Grey, fine-grained silty sand (SM)	4.00	12.25	17.65	7.84
3	Dense, Brownish, fine-grained silty sand (SM)	12.25	20.25	19.00	9.19
4	Very Dense, Gray to Brownish, fine-grained silty sand (SM)	20.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	7	0.75	0.90	1.33	1.05	7	1.70	11	27.8	4.54	1.14	17	0.18	1.00	0.10	0.80	1.64	1.00	0.30	0.99	0.381	0.79	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	9	0.80	0.90	1.33	1.05	9	1.70	15	27.8	4.54	1.14	22	0.24	1.00	0.17	0.80	1.36	1.00	0.33	0.98	0.375	0.88	Liquefiable Soil
3	4.00	5.50	4.75	79.24	32.66	11	0.85	0.90	1.33	1.05	12	1.70	20	19.5	3.53	1.08	25	0.29	1.00	0.21	0.80	1.25	1.00	0.37	0.96	0.365	1.00	Liquefiable Soil
4	5.50	7.00	6.25	105.71	44.42	17	0.95	0.90	1.33	1.05	20	1.50	30	33.7	4.92	1.19	41	NL	1.00	0.34	0.80	1.18	1.00	NL	0.95	0.353	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.19	56.19	21	0.95	0.90	1.33	1.05	25	1.33	33	19.6	3.54	1.08	40	NL	1.00	0.41	0.79	1.13	1.00	NL	0.94	0.345	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.66	67.95	20	0.95	0.90	1.33	1.05	24	1.21	29	19.6	3.54	1.08	35	NL	1.00	0.40	0.80	1.08	1.00	NL	0.93	0.338	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.14	79.72	25	1.00	0.90	1.33	1.05	31	1.12	35	20.9	3.76	1.09	42	NL	1.00	0.51	0.74	1.06	1.00	NL	0.89	0.321	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.61	91.48	31	1.00	0.90	1.33	1.05	39	1.05	41	24.8	4.27	1.11	50	NL	1.00	0.63	0.68	1.03	1.00	NL	0.85	0.306	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	240.11	105.27	34	1.00	0.90	1.33	1.05	43	0.97	42	17.9	3.22	1.07	48	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.287	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	268.61	119.06	38	1.00	0.90	1.33	1.05	48	0.92	44	25.8	4.37	1.12	53	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.270	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	297.11	132.85	42	1.00	0.90	1.33	1.05	53	0.87	46	26.6	4.45	1.13	56	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.254	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	325.61	146.64	45	1.00	0.90	1.33	1.05	57	0.83	47	25.7	4.36	1.12	57	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.238	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	354.11	160.43	48	1.00	0.90	1.33	1.05	60	0.79	48	24.4	4.22	1.11	57	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	383.61	175.22	52	1.00	0.90	1.33	1.05	65	0.76	49	22.5	3.99	1.10	58	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	413.61	190.51	57	1.00	0.90	1.33	1.05	72	0.72	52	27.2	4.49	1.13	63	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	443.61	205.80	60	1.00	0.90	1.33	1.05	75	0.70	53	23.1	4.08	1.10	62	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	473.61	221.09	60	1.00	0.90	1.33	1.05	75	0.67	51	20.2	3.64	1.08	58	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	503.61	236.38	71	1.00	0.90	1.33	1.05	89	0.65	58	23.5	4.11	1.10	68	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	538.61	254.22	100	1.00	0.90	1.33	1.05	126	0.63	79	25.5	4.34	1.12	93	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	558.61	264.41	100	1.00	0.90	1.33	1.05	126	0.61	77	23.8	4.16	1.11	90	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-83
Chainage	8+793

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Brownish, fine-grained silty sand with Gravel(SM)	4.00	9.25	17.65	7.84
3	Dense, Brownish Grey, fine-grained silty sand (SM)	9.25	16.00	19.00	9.19
4	Very Dense, Yellowish Brown to Brownish , fine-grained silty sand (S	16.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	7	0.75	0.90	1.33	1.05	7	1.70	11	19.0	3.44	1.07	15	0.16	1.00	0.10	0.80	1.64	1.00	0.27	0.99	0.381	0.71	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	9	0.80	0.90	1.33	1.05	9	1.70	15	19.0	3.44	1.07	20	0.21	1.00	0.17	0.80	1.36	1.00	0.29	0.98	0.375	0.78	Liquefiable Soil
3	4.00	5.50	4.75	79.24	32.66	15	0.85	0.90	1.33	1.05	16	1.70	27	25.2	4.31	1.12	35	NL	1.00	0.27	0.80	1.25	1.00	NL	0.96	0.365	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	105.71	44.42	20	0.95	0.90	1.33	1.05	24	1.50	36	25.2	4.31	1.12	44	NL	1.00	0.40	0.80	1.18	1.00	NL	0.95	0.353	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.19	56.19	24	0.95	0.90	1.33	1.05	29	1.33	38	28.3	4.58	1.14	48	NL	1.00	0.47	0.76	1.15	1.00	NL	0.94	0.345	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.66	67.95	31	0.95	0.90	1.33	1.05	37	1.21	45	22.3	3.97	1.10	53	NL	1.00	0.60	0.70	1.12	1.00	NL	0.93	0.338	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.16	81.74	37	1.00	0.90	1.33	1.05	47	1.11	51	27.4	4.52	1.13	63	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.317	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.66	95.53	47	1.00	0.90	1.33	1.05	59	1.02	60	21.1	3.79	1.09	69	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.298	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.16	109.32	52	1.00	0.90	1.33	1.05	65	0.96	63	25.4	4.33	1.12	74	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.281	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	272.66	123.11	48	1.00	0.90	1.33	1.05	60	0.90	54	20.5	3.70	1.08	63	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.265	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	301.91	137.65	63	1.00	0.90	1.33	1.05	79	0.85	67	31.4	4.79	1.17	83	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.249	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	331.91	152.94	71	1.00	0.90	1.33	1.05	89	0.81	72	24.4	4.23	1.11	84	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.232	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	361.91	168.23	74	1.00	0.90	1.33	1.05	93	0.77	72	30.4	4.73	1.16	88	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.217	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	391.91	183.52	68	1.00	0.90	1.33	1.05	85	0.74	63	22.3	3.96	1.09	73	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.202	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	421.91	198.81	65	1.00	0.90	1.33	1.05	82	0.71	58	20.3	3.67	1.08	66	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	451.91	214.10	100	1.00	0.90	1.33	1.05	126	0.68	86	22.0	3.93	1.09	98	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	481.91	229.39	100	1.00	0.90	1.33	1.05	126	0.66	83	23.8	4.16	1.11	96	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.159	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	511.91	244.68	100	1.00	0.90	1.33	1.05	126	0.64	80	21.8	3.89	1.09	92	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	546.91	262.52	100	1.00	0.90	1.33	1.05	126	0.62	78	19.7	3.56	1.08	87	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	566.91	272.71	100	1.00	0.90	1.33	1.05	126	0.61	76	21.5	3.85	1.09	87	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-84
Chainage	8+939

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	6.25	16.50	6.69
2	Medium Dense, Brownish, fine-grained silty sand with Gravel (SM)	6.25	11.25	17.65	7.84
3	Dense to Very Dense, Whiteish Grey to Brownish Grey, fine-grained	11.25	15.25	19.00	9.19
4	Very Dense, Dark Greyish to Brownish, fine-grained silty sand with G	15.25	26.25	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	20.2	3.64	1.08	14	0.15	1.00	0.06	0.80	1.64	1.00	0.25	0.99	0.381	0.65	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	7	0.80	0.90	1.33	1.05	7	1.70	12	19.0	3.44	1.07	16	0.17	1.00	0.11	0.80	1.36	1.00	0.23	0.98	0.375	0.63	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	11	0.85	0.90	1.33	1.05	12	1.70	20	26.3	4.42	1.13	27	0.34	1.00	0.21	0.80	1.26	1.00	0.42	0.96	0.371	1.14	Liquefiable Soil
4	5.50	7.00	6.25	103.13	41.83	10	0.95	0.90	1.33	1.05	12	1.55	18	26.3	4.42	1.13	25	0.30	1.00	0.21	0.80	1.19	1.00	0.35	0.95	0.366	0.96	Liquefiable Soil
5	7.00	8.50	7.75	129.60	53.60	15	0.95	0.90	1.33	1.05	18	1.37	24	28.1	4.57	1.14	32	NL	1.00	0.30	0.80	1.13	1.00	NL	0.94	0.355	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	156.08	65.36	20	0.95	0.90	1.33	1.05	24	1.24	30	28.1	4.57	1.14	38	NL	1.00	0.40	0.80	1.09	1.00	NL	0.93	0.346	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	182.55	77.13	27	1.00	0.90	1.33	1.05	34	1.14	39	20.0	3.61	1.08	45	NL	1.00	0.55	0.72	1.07	1.00	NL	0.89	0.327	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	210.38	90.24	35	1.00	0.90	1.33	1.05	44	1.05	46	23.2	4.08	1.10	55	NL	1.00	0.85	0.60	1.04	1.00	NL	0.85	0.308	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	238.88	104.03	41	1.00	0.90	1.33	1.05	52	0.98	51	27.7	4.54	1.14	62	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.289	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	267.38	117.82	54	1.00	0.90	1.33	1.05	68	0.92	63	24.6	4.25	1.11	74	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.271	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	297.38	133.11	59	1.00	0.90	1.33	1.05	74	0.87	64	26.7	4.45	1.13	77	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.253	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	327.38	148.40	65	1.00	0.90	1.33	1.05	82	0.82	67	27.4	4.51	1.13	81	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.236	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	357.38	163.69	72	1.00	0.90	1.33	1.05	90	0.78	71	31.0	4.77	1.16	87	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.220	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	387.38	178.98	75	1.00	0.90	1.33	1.05	94	0.75	70	24.4	4.23	1.11	82	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.205	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	417.38	194.27	82	1.00	0.90	1.33	1.05	103	0.72	74	19.2	3.47	1.07	83	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.190	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	447.38	209.56	100	1.00	0.90	1.33	1.05	126	0.69	87	24.7	4.25	1.11	101	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	477.38	224.85	100	1.00	0.90	1.33	1.05	126	0.67	84	23.7	4.14	1.11	97	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.161	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	487.38	229.95	100	1.00	0.90	1.33	1.05	126	0.66	83	29.1	4.64	1.15	100	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	487.38	229.95	100	1.00	0.90	1.33	1.05	126	0.66	83	25.0	4.29	1.12	97	NL	1.00	0.85	0.60	0.72	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	487.38	229.95	100	1.00	0.90	1.33	1.05	126	0.66	83	26.6	4.45	1.13	98	NL	1.00	0.85	0.60	0.72	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-85
Chainage	9+024

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish to Whiteish Grey, fine-grained silty sand (SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Brownish Grey, fine-grained silty sand with Gravel (S	4.00	10.00	17.65	7.84
3	Dense, Brownish, fine-grained silty sand(SM)	10.00	16.00	19.00	9.19
4	Very Dense, Brownish Grey, fine-grained silty sand and Gravel(SM)	16.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	27.4	4.51	1.13	15	0.16	1.00	0.06	0.80	1.64	1.00	0.27	0.99	0.381	0.71	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	8	0.80	0.90	1.33	1.05	8	1.70	14	27.4	4.51	1.13	20	0.22	1.00	0.15	0.80	1.36	1.00	0.29	0.98	0.375	0.78	Liquefiable Soil
3	4.00	5.50	4.75	79.24	32.66	12	0.85	0.90	1.33	1.05	13	1.70	22	30.9	4.76	1.16	30	NL	1.00	0.22	0.80	1.25	1.00	NL	0.96	0.365	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	105.71	44.42	17	0.95	0.90	1.33	1.05	20	1.50	30	30.9	4.76	1.16	40	NL	1.00	0.34	0.80	1.18	1.00	NL	0.95	0.353	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.19	56.19	21	0.95	0.90	1.33	1.05	25	1.33	33	17.4	3.10	1.06	39	NL	1.00	0.41	0.79	1.13	1.00	NL	0.94	0.345	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.66	67.95	28	0.95	0.90	1.33	1.05	33	1.21	41	23.5	4.12	1.10	49	NL	1.00	0.55	0.73	1.11	1.00	NL	0.93	0.338	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.15	80.73	31	1.00	0.90	1.33	1.05	39	1.11	43	25.6	4.35	1.12	53	NL	1.00	0.63	0.68	1.07	1.00	NL	0.89	0.319	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	214.65	94.52	35	1.00	0.90	1.33	1.05	44	1.03	45	27.2	4.50	1.13	56	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.300	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	243.15	108.31	56	1.00	0.90	1.33	1.05	70	0.96	68	29.9	4.70	1.15	83	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.283	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.65	122.10	43	1.00	0.90	1.33	1.05	54	0.90	49	31.7	4.81	1.17	62	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.266	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	300.90	136.64	51	1.00	0.90	1.33	1.05	64	0.86	55	29.0	4.64	1.15	67	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.250	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.90	151.93	56	1.00	0.90	1.33	1.05	70	0.81	57	5.6	0.01	1.00	57	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.90	167.22	61	1.00	0.90	1.33	1.05	77	0.77	59	25.5	4.33	1.12	71	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	390.90	182.51	65	1.00	0.90	1.33	1.05	82	0.74	60	22.2	3.95	1.09	70	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	420.90	197.80	69	1.00	0.90	1.33	1.05	87	0.71	62	26.6	4.44	1.13	74	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.188	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	450.90	213.09	76	1.00	0.90	1.33	1.05	96	0.69	65	19.6	3.54	1.08	74	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.174	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	480.90	228.38	100	1.00	0.90	1.33	1.05	126	0.66	83	25.2	4.31	1.12	97	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.160	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	510.90	243.67	100	1.00	0.90	1.33	1.05	126	0.64	81	18.2	3.26	1.07	89	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	545.90	261.51	100	1.00	0.90	1.33	1.05	126	0.62	78	21.3	3.82	1.09	88	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	565.90	271.70	100	1.00	0.90	1.33	1.05	126	0.61	76	24.2	4.20	1.11	89	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-86
Chainage	9+115

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Grey Brownish, fine-grained silty sand (SM)	4.00	8.25	17.65	7.84
3	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with s	8.25	14.25	19.40	9.59
4	Dense, Greyish, fine-grained silty sand (SM)	14.25	19.00	19.00	9.19
5	Very Dense, Brownish Grey to Brownish, fine-grained silty sand (SM)	19.00	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	28.7	4.61	1.14	16	0.17	1.00	0.06	0.80	1.64	1.00	0.27	0.99	0.381	0.72	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	7	0.80	0.90	1.33	1.05	7	1.70	12	28.6	4.61	1.14	18	0.20	1.00	0.11	0.80	1.36	1.00	0.26	0.98	0.375	0.71	Liquefiable Soil
3	4.00	5.50	4.75	79.24	32.66	11	0.85	0.90	1.33	1.05	12	1.70	20	25.2	4.31	1.12	27	0.33	1.00	0.21	0.80	1.25	1.00	0.41	0.96	0.365	1.13	Liquefiable Soil
4	5.50	7.00	6.25	105.71	44.42	13	0.95	0.90	1.33	1.05	16	1.50	23	28.4	4.59	1.14	31	NL	1.00	0.27	0.80	1.18	1.00	NL	0.95	0.353	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.19	56.19	16	0.95	0.90	1.33	1.05	19	1.33	25	21.9	3.91	1.09	32	NL	1.00	0.32	0.80	1.12	1.00	NL	0.94	0.345	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	160.41	69.70	17	0.95	0.90	1.33	1.05	20	1.20	24	74.0	0.50	1.20	30	0.45	1.00	0.34	0.80	1.07	1.00	0.48	0.93	0.334	1.44	Non Liquefiable Soil
7	10.00	11.50	10.75	189.51	84.09	21	1.00	0.90	1.33	1.05	26	1.09	29	74.0	0.50	1.20	35	NL	1.00	0.44	0.78	1.04	1.00	NL	0.89	0.312	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.61	98.48	27	1.00	0.90	1.33	1.05	34	1.01	34	60.3	0.50	1.20	42	NL	1.00	0.55	0.72	1.00	1.00	NL	0.85	0.293	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	247.71	112.87	30	1.00	0.90	1.33	1.05	38	0.94	35	70.8	0.50	1.20	43	NL	1.00	0.61	0.69	0.96	1.00	NL	0.81	0.276	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	276.41	126.86	37	1.00	0.90	1.33	1.05	47	0.89	41	29.8	4.69	1.15	52	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.261	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	304.91	140.65	44	1.00	0.90	1.33	1.05	55	0.84	47	29.8	4.69	1.15	58	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.246	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	333.41	154.44	47	1.00	0.90	1.33	1.05	59	0.80	48	28.3	4.58	1.14	59	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.231	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	362.66	168.98	51	1.00	0.90	1.33	1.05	64	0.77	49	25.2	4.31	1.12	59	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.217	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	392.66	184.27	55	1.00	0.90	1.33	1.05	69	0.74	51	31.3	4.79	1.17	64	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.202	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	422.66	199.56	60	1.00	0.90	1.33	1.05	75	0.71	53	20.1	3.64	1.08	61	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.187	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	452.66	214.85	72	1.00	0.90	1.33	1.05	90	0.68	62	29.4	4.67	1.15	76	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	482.66	230.14	100	1.00	0.90	1.33	1.05	126	0.66	83	25.0	4.29	1.11	97	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.159	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	512.66	245.43	100	1.00	0.90	1.33	1.05	126	0.64	80	31.1	4.78	1.16	98	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.145	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	547.66	263.27	100	1.00	0.90	1.33	1.05	126	0.62	77	21.2	3.81	1.09	88	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	567.66	273.46	100	1.00	0.90	1.33	1.05	126	0.60	76	29.4	4.67	1.15	92	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-87
Chainage	9+244

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Greyish, fine-grained silty sand (SM)	0.00	4.00	17.10	7.29
2	Medium Dense, Greyish, fine-grained silty sand (SM)	4.00	10.00	17.45	7.64
3	Dense, Brownish to Greyish, fine-grained silty sand (SM)	10.00	18.25	17.10	7.29
4	Very Dense, Brownish to Dark Greyish, fine-grained silty sand (SM)	18.25	30.50	19.00	9.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	21.38	9.12	7	0.75	0.90	1.33	1.05	7	1.70	11	26.2	4.40	1.12	17	0.18	1.00	0.10	0.80	1.61	1.00	0.29	0.99	0.362	0.81	Liquefiable Soil
2	2.50	4.00	3.25	55.58	23.70	9	0.80	0.90	1.33	1.05	9	1.70	15	26.2	4.40	1.12	22	0.24	1.00	0.17	0.80	1.33	1.00	0.32	0.98	0.357	0.89	Liquefiable Soil
3	4.00	5.50	4.75	81.49	34.91	13	0.85	0.90	1.33	1.05	14	1.69	24	18.6	3.35	1.07	28	0.39	1.00	0.24	0.80	1.23	1.00	0.48	0.96	0.351	1.36	Non Liquefiable Soil
4	5.50	7.00	6.25	107.66	46.37	16	0.95	0.90	1.33	1.05	19	1.47	28	18.6	3.35	1.07	33	NL	1.00	0.32	0.80	1.17	1.00	NL	0.95	0.345	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	133.84	57.84	19	0.95	0.90	1.33	1.05	23	1.31	30	26.2	4.41	1.12	38	NL	1.00	0.38	0.80	1.12	1.00	NL	0.94	0.340	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	160.01	69.30	29	0.95	0.90	1.33	1.05	35	1.20	42	17.4	3.11	1.06	47	NL	1.00	0.57	0.72	1.11	1.00	NL	0.93	0.335	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	185.93	80.50	33	1.00	0.90	1.33	1.05	41	1.11	46	25.8	4.37	1.12	56	NL	1.00	0.85	0.60	1.09	1.00	NL	0.89	0.320	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.58	91.44	35	1.00	0.90	1.33	1.05	44	1.05	46	26.1	4.40	1.12	56	NL	1.00	0.85	0.60	1.04	1.00	NL	0.85	0.306	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	237.23	102.38	39	1.00	0.90	1.33	1.05	49	0.99	48	24.8	4.27	1.11	58	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.292	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	262.88	113.32	45	1.00	0.90	1.33	1.05	57	0.94	53	25.3	4.32	1.12	64	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.277	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	288.53	124.26	48	1.00	0.90	1.33	1.05	60	0.90	54	25.2	4.31	1.12	65	NL	1.00	0.85	0.60	0.92	1.00	NL	0.73	0.263	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	314.18	135.20	51	1.00	0.90	1.33	1.05	64	0.86	55	27.8	4.54	1.14	67	NL	1.00	0.85	0.60	0.89	2.00	NL	0.69	0.249	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	342.68	148.99	53	1.00	0.90	1.33	1.05	67	0.82	55	27.9	4.55	1.14	67	NL	1.00	0.85	0.60	0.85	3.00	NL	0.65	0.232	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	371.18	162.78	58	1.00	0.90	1.33	1.05	73	0.78	57	27.2	4.50	1.13	69	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.216	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	399.68	176.57	62	1.00	0.90	1.33	1.05	78	0.75	59	24.2	4.20	1.11	69	NL	1.00	0.85	0.60	0.80	5.00	NL	0.57	0.200	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	428.18	190.36	100	1.00	0.90	1.33	1.05	126	0.72	91	24.6	4.24	1.11	106	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.185	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	456.68	204.15	100	1.00	0.90	1.33	1.05	126	0.70	88	27.1	4.49	1.13	104	NL	1.00	0.85	0.60	0.75	7.00	NL	0.49	0.170	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	485.18	217.94	100	1.00	0.90	1.33	1.05	126	0.68	85	23.3	4.09	1.10	98	NL	1.00	0.85	0.60	0.73	8.00	NL	0.45	0.155	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	518.43	234.03	100	1.00	0.90	1.33	1.05	126	0.65	82	20.2	3.64	1.08	92	NL	1.00	0.85	0.60	0.71	9.00	NL	0.40	0.138	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	537.43	243.23	100	1.00	0.90	1.33	1.05	126	0.64	81	24.5	4.24	1.11	94	NL	1.00	0.85	0.60	0.70	10.00	NL	0.37	0.129	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-88
Chainage	9+346

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand (SM)	0.00	7.00	16.50	6.69
2	Medium Dense, Grey Brownish, fine-grained silty sand (SM)	7.00	11.25	17.65	7.84
3	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticit	11.25	19.00	19.40	9.59
4	Dense, Greyish, fine-grained silty sand (SM)	19.00	26.25	19.00	9.19
5	Very Dense, Brownish Grey, fine-grained silty sand (SM)	26.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	26.3	4.42	1.12	15	0.16	1.00	0.06	0.80	1.64	1.00	0.27	0.99	0.381	0.70	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	7	0.80	0.90	1.33	1.05	7	1.70	12	26.3	4.42	1.12	18	0.19	1.00	0.11	0.80	1.36	1.00	0.26	0.98	0.375	0.69	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	9	0.85	0.90	1.33	1.05	10	1.70	16	28.1	4.57	1.14	23	0.26	1.00	0.17	0.80	1.26	1.00	0.33	0.96	0.371	0.88	Liquefiable Soil
4	5.50	7.00	6.25	103.13	41.83	12	0.95	0.90	1.33	1.05	14	1.55	22	22.2	3.95	1.09	28	0.38	1.00	0.25	0.80	1.19	1.00	0.45	0.95	0.366	1.22	Non Liquefiable Soil
5	7.00	8.50	7.75	128.74	52.74	15	0.95	0.90	1.33	1.05	18	1.38	25	20.0	3.62	1.08	30	NL	1.00	0.30	0.80	1.14	1.00	NL	0.94	0.358	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	155.21	64.50	17	0.95	0.90	1.33	1.05	20	1.25	25	25.5	4.34	1.12	33	NL	1.00	0.34	0.80	1.09	1.00	NL	0.93	0.349	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	181.69	76.27	21	1.00	0.90	1.33	1.05	26	1.15	30	69.2	0.50	1.20	37	NL	1.00	0.44	0.78	1.06	1.00	NL	0.89	0.330	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	209.91	89.78	28	1.00	0.90	1.33	1.05	35	1.06	37	69.2	0.50	1.20	45	NL	1.00	0.57	0.71	1.03	1.00	NL	0.85	0.309	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	239.01	104.17	33	1.00	0.90	1.33	1.05	41	0.98	41	69.2	0.50	1.20	49	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.289	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	268.11	118.56	40	1.00	0.90	1.33	1.05	50	0.92	46	29.2	4.65	1.15	58	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.271	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	297.21	132.95	44	1.00	0.90	1.33	1.05	55	0.87	48	22.2	3.96	1.09	56	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.253	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	326.31	147.34	59	1.00	0.90	1.33	1.05	74	0.82	61	40.3	0.50	1.20	74	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.237	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	355.11	161.43	65	1.00	0.90	1.33	1.05	82	0.79	64	31.9	4.82	1.17	80	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.222	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	383.61	175.22	100	1.00	0.90	1.33	1.05	126	0.76	95	23.8	4.15	1.11	109	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	412.11	189.01	100	1.00	0.90	1.33	1.05	126	0.73	91	17.0	3.00	1.06	100	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.193	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	440.61	202.80	100	1.00	0.90	1.33	1.05	126	0.70	88	26.2	4.41	1.12	104	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	469.11	216.59	100	1.00	0.90	1.33	1.05	126	0.68	85	20.7	3.73	1.08	96	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	498.61	231.38	100	1.00	0.90	1.33	1.05	126	0.66	83	26.6	4.45	1.13	98	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	533.61	249.22	100	1.00	0.90	1.33	1.05	126	0.63	80	17.2	3.07	1.06	88	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	553.61	259.41	100	1.00	0.90	1.33	1.05	126	0.62	78	31.5	4.80	1.17	96	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-89
Chainage	9+428

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Greyish, fine-grained silty sand (SM)	0.00	5.25	16.50	6.69
2	Medium Dense, Greyish, fine-grained silty sand (SM)	5.25	8.25	17.65	7.84
3	Very Stiff to Hard, Brownish, fine-grained inorganic silt of low Plasticit	8.25	14.25	19.40	9.59
4	Very Dense, Brownish Gray, fine-grained silty sand and Gravel (SM)	14.25	20.25	20.00	10.19
5	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand(	20.25	24.25	19.40	9.59
6	Very Dense, Brownish Gray, fine-grained silty sand (SM)	24.25	30.50	20.00	10.19

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	5	0.75	0.90	1.33	1.05	5	1.70	8	23.1	4.08	1.10	13	0.14	1.00	0.03	0.80	1.64	1.00	0.23	0.99	0.381	0.60	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	7	0.80	0.90	1.33	1.05	7	1.70	12	23.5	4.13	1.10	17	0.18	1.00	0.11	0.80	1.36	1.00	0.25	0.98	0.375	0.67	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	9	0.85	0.90	1.33	1.05	10	1.70	16	28.8	4.62	1.14	23	0.26	1.00	0.17	0.80	1.26	1.00	0.33	0.96	0.371	0.89	Liquefiable Soil
4	5.50	7.00	6.25	104.28	42.98	11	0.95	0.90	1.33	1.05	13	1.53	20	28.8	4.62	1.14	28	0.35	1.00	0.23	0.80	1.18	1.00	0.42	0.95	0.360	1.17	Liquefiable Soil
5	7.00	8.50	7.75	130.75	54.75	15	0.95	0.90	1.33	1.05	18	1.35	24	32.4	4.85	1.17	33	NL	1.00	0.30	0.80	1.13	1.00	NL	0.94	0.350	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.98	68.26	18	0.95	0.90	1.33	1.05	21	1.21	26	74.1	0.50	1.20	32	NL	1.00	0.36	0.80	1.08	1.00	NL	0.93	0.338	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	188.08	82.65	21	1.00	0.90	1.33	1.05	26	1.10	29	74.1	0.50	1.20	35	NL	1.00	0.44	0.78	1.04	1.00	NL	0.89	0.315	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	217.18	97.04	33	1.00	0.90	1.33	1.05	41	1.02	42	68.2	0.50	1.20	51	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.296	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	246.28	111.43	45	1.00	0.90	1.33	1.05	57	0.95	54	75.0	0.50	1.20	65	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.278	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	275.98	126.42	53	1.00	0.90	1.33	1.05	67	0.89	59	25.6	4.35	1.12	71	NL	1.00	0.85	0.60	0.91	1.00	NL	0.77	0.261	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	305.98	141.71	57	1.00	0.90	1.33	1.05	72	0.84	60	23.6	4.13	1.10	71	NL	1.00	0.85	0.60	0.87	1.00	NL	0.73	0.245	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	335.98	157.00	65	1.00	0.90	1.33	1.05	82	0.80	65	20.8	3.74	1.08	74	NL	1.00	0.85	0.60	0.83	2.00	NL	0.69	0.229	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	365.98	172.29	72	1.00	0.90	1.33	1.05	90	0.76	69	29.9	4.70	1.15	84	NL	1.00	0.85	0.60	0.80	3.00	NL	0.65	0.214	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	395.38	186.98	100	1.00	0.90	1.33	1.05	126	0.73	92	71.7	0.50	1.20	111	NL	1.00	0.85	0.60	0.78	4.00	NL	0.61	0.200	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	424.48	201.37	100	1.00	0.90	1.33	1.05	126	0.70	89	69.4	0.50	1.20	107	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.186	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	453.58	215.76	100	1.00	0.90	1.33	1.05	126	0.68	86	75.2	0.50	1.20	103	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.173	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	482.68	230.15	100	1.00	0.90	1.33	1.05	126	0.66	83	30.0	4.71	1.15	100	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.159	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	511.78	244.54	100	1.00	0.90	1.33	1.05	126	0.64	80	20.5	3.70	1.08	91	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.146	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	545.73	261.33	100	1.00	0.90	1.33	1.05	126	0.62	78	27.4	4.52	1.13	93	NL	1.00	0.85	0.60	0.68	9.00	NL	0.40	0.130	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	565.13	270.93	100	1.00	0.90	1.33	1.05	126	0.61	76	27.6	4.53	1.13	91	NL	1.00	0.85	0.60	0.67	10.00	NL	0.37	0.121	NL	Non Liquefiable Soil

B.11. Zone 11: CH: 9+430 km to 10+540 km (BH-91 to BH-100)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-91	0.00	2.50	7	7	11	14	0.25	0.40	0.63	Liquefiable Soil
BH-91	2.50	4.00	9	9	15	19	0.28	0.39	0.72	Liquefiable Soil
BH-92	0.00	2.50	5	5	8	13	0.23	0.36	0.62	Liquefiable Soil
BH-92	2.50	4.00	9	9	15	20	0.28	0.36	0.79	Liquefiable Soil
BH-92	4.00	5.50	10	11	18	24	0.34	0.35	0.98	Liquefiable Soil
BH-93	0.00	2.50	7	7	11	16	0.27	0.38	0.72	Liquefiable Soil
BH-93	2.50	4.00	9	9	15	16	0.23	0.37	0.61	Liquefiable Soil
BH-93	4.00	5.50	10	11	18	24	0.35	0.37	0.94	Liquefiable Soil
BH-95	0.00	2.50	7	7	11	17	0.30	0.38	0.78	Liquefiable Soil
BH-95	2.50	4.00	8	8	14	20	0.29	0.37	0.77	Liquefiable Soil
BH-95	4.00	5.50	12	13	22	27	0.42	0.36	1.15	Liquefiable Soil
BH-96	0.00	2.50	5	5	8	13	0.22	0.35	0.63	Liquefiable Soil
BH-96	2.50	4.00	7	7	12	17	0.24	0.34	0.69	Liquefiable Soil
BH-96	4.00	5.50	9	10	16	21	0.27	0.34	0.81	Liquefiable Soil
BH-97	0.00	2.50	7	7	11	14	0.25	0.40	0.63	Liquefiable Soil
BH-97	2.50	4.00	9	9	15	19	0.28	0.39	0.72	Liquefiable Soil
BH-98	0.00	2.50	6	6	10	14	0.25	0.38	0.66	Liquefiable Soil
BH-98	2.50	4.00	7	7	12	17	0.24	0.37	0.65	Liquefiable Soil
BH-98	4.00	5.50	7	7	13	19	0.26	0.37	0.71	Liquefiable Soil
BH-98	5.50	7.00	12	14	22	26	0.37	0.36	1.03	Liquefiable Soil
BH-98	8.50	10.00	13	16	20	24	0.31	0.36	0.85	Liquefiable Soil
BH-98	10.00	11.50	15	19	22	27	0.37	0.34	1.09	Liquefiable Soil
BH-99	0.00	2.50	9	8	14	19	0.33	0.35	0.95	Liquefiable Soil
BH-100	0.00	2.50	7	7	11	17	0.30	0.38	0.80	Liquefiable Soil
BH-100	2.50	4.00	9	9	15	22	0.33	0.37	0.89	Liquefiable Soil
BH-100	4.00	5.50	10	11	18	24	0.35	0.37	0.96	Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-91
Chainage	9+626

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Brownish, fine-grained inorganic silt of low Plastici	0.00	4.00	16.10	6.29
2	Medium Dense, Greyish to Brownish, fine-grained silty sand with Gravel	4.00	8.25	17.15	7.34
3	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with san	8.25	14.25	17.75	7.94
4	Dense to Very Dense, Brownish Grey to Brownish, fine-grained silty sand	14.25	21.25	18.15	8.34
5	Very Dense, Brownish Grey, fine-grained silty sand with Gravel (	21.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS}$ > 30)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.13	7.87	7	0.75	0.90	1.33	1.05	7	1.70	11	72.00	0.50	1.20	14	0.15	1.00	0.10	0.80	1.66	1.00	0.25	0.99	0.395	0.63	Liquefiable Soil
2	2.50	4.00	3.25	52.33	20.45	9	0.80	0.90	1.33	1.05	9	1.70	15	55.06	0.50	1.20	19	0.20	1.00	0.17	0.80	1.37	1.00	0.28	0.98	0.389	0.72	Liquefiable Soil
3	4.00	5.50	4.75	77.26	30.68	11	0.85	0.90	1.33	1.05	12	1.70	20	31.41	4.79	1.17	28	0.37	1.00	0.21	0.80	1.27	1.00	0.47	0.96	0.379	1.25	Non Liquefiable Soil
4	5.50	7.00	6.25	102.99	41.70	16	0.95	0.90	1.33	1.05	19	1.55	30	31.41	4.79	1.17	39	NL	1.00	0.32	0.80	1.19	1.00	NL	0.95	0.367	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	128.71	52.71	19	0.95	0.90	1.33	1.05	23	1.38	31	23.50	4.12	1.10	39	NL	1.00	0.38	0.80	1.14	1.00	NL	0.94	0.358	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	155.04	64.33	26	0.95	0.90	1.33	1.05	31	1.25	39	68.03	0.50	1.20	47	NL	1.00	0.51	0.75	1.12	1.00	NL	0.93	0.349	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	181.66	76.24	30	1.00	0.90	1.33	1.05	38	1.15	43	75.50	0.50	1.20	52	NL	1.00	0.61	0.69	1.09	1.00	NL	0.89	0.330	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.29	88.16	27	1.00	0.90	1.33	1.05	34	1.07	36	75.50	0.50	1.20	44	NL	1.00	0.55	0.72	1.04	1.00	NL	0.85	0.312	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	234.91	100.07	32	1.00	0.90	1.33	1.05	40	1.00	40	66.08	0.50	1.20	49	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.295	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	261.94	112.39	42	1.00	0.90	1.33	1.05	53	0.94	50	25.25	4.31	1.12	60	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.279	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	289.16	124.90	52	1.00	0.90	1.33	1.05	65	0.89	58	27.14	4.49	1.13	71	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.262	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	316.39	137.42	55	1.00	0.90	1.33	1.05	69	0.85	59	28.28	4.58	1.14	72	NL	1.00	0.85	0.60	0.88	2.00	NL	0.69	0.247	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	343.61	149.93	72	1.00	0.90	1.33	1.05	90	0.82	74	22.59	4.01	1.10	85	NL	1.00	0.85	0.60	0.85	3.00	NL	0.65	0.231	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	370.84	162.45	46	1.00	0.90	1.33	1.05	58	0.78	45	29.67	4.68	1.15	57	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.216	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	400.09	176.99	54	1.00	0.90	1.33	1.05	68	0.75	51	28.46	4.60	1.14	63	NL	1.00	0.85	0.60	0.80	5.00	NL	0.57	0.200	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	429.34	191.53	100	1.00	0.90	1.33	1.05	126	0.72	91	32.03	4.83	1.17	111	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.184	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	458.59	206.07	100	1.00	0.90	1.33	1.05	126	0.70	88	26.80	4.46	1.13	103	NL	1.00	0.85	0.60	0.75	7.00	NL	0.49	0.169	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	487.84	220.61	100	1.00	0.90	1.33	1.05	126	0.67	85	31.01	4.77	1.16	103	NL	1.00	0.85	0.60	0.73	8.00	NL	0.45	0.154	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	521.96	237.57	100	1.00	0.90	1.33	1.05	126	0.65	82	21.08	3.79	1.09	92	NL	1.00	0.85	0.60	0.71	9.00	NL	0.40	0.137	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	541.46	247.26	100	1.00	0.90	1.33	1.05	126	0.64	80	32.88	4.88	1.18	99	NL	1.00	0.85	0.60	0.70	10.00	NL	0.37	0.127	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-92
Chainage	9+737

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Greyish to Brownish, fine-grained silty sand with Gravel	0.00	5.25	17.15	7.34
2	Stiff to Very Stiff, Brownish to Yellowish, fine-grained inorganic silt of lo	5.25	13.00	17.00	7.19
3	Dense, Brownish, fine-grained silty sand with Gravel (SM)	13.00	17.25	18.15	8.34
4	Hard, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity	17.25	24.25	18.30	8.49
5	Hard, Brownish, fine-grained inorganic silt of low Plasticity with s	24.25	30.50	18.30	8.49

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	21.44	9.18	5	0.75	0.90	1.33	1.05	5	1.70	8	23.30	4.10	1.10	13	0.14	1.00	0.03	0.80	1.61	1.00	0.23	0.99	0.361	0.62	Liquefiable Soil
2	2.50	4.00	3.25	55.74	23.87	9	0.80	0.90	1.33	1.05	9	1.70	15	17.75	3.18	1.06	20	0.21	1.00	0.17	0.80	1.33	1.00	0.28	0.98	0.355	0.79	Liquefiable Soil
3	4.00	5.50	4.75	81.46	34.88	10	0.85	0.90	1.33	1.05	11	1.69	18	24.33	4.22	1.11	24	0.28	1.00	0.19	0.80	1.23	1.00	0.34	0.96	0.351	0.98	Liquefiable Soil
4	5.50	7.00	6.25	107.04	45.75	14	0.95	0.90	1.33	1.05	17	1.48	25	76.29	0.50	1.20	30	NL	1.00	0.28	0.80	1.17	1.00	NL	0.95	0.348	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.54	56.54	21	0.95	0.90	1.33	1.05	25	1.33	33	76.29	0.50	1.20	41	NL	1.00	0.41	0.79	1.13	1.00	NL	0.94	0.344	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.04	67.33	25	0.95	0.90	1.33	1.05	30	1.22	36	75.00	0.50	1.20	44	NL	1.00	0.49	0.76	1.10	1.00	NL	0.93	0.340	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	183.54	78.12	29	1.00	0.90	1.33	1.05	36	1.13	41	75.00	0.50	1.20	50	NL	1.00	0.59	0.70	1.08	1.00	NL	0.89	0.325	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	209.04	88.91	32	1.00	0.90	1.33	1.05	40	1.06	43	53.48	0.50	1.20	52	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.311	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	235.40	100.56	34	1.00	0.90	1.33	1.05	43	1.00	43	23.62	4.13	1.10	51	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.295	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	262.63	113.07	43	1.00	0.90	1.33	1.05	54	0.94	51	35.35	0.50	1.20	61	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.278	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	289.85	125.59	49	1.00	0.90	1.33	1.05	62	0.89	55	26.26	4.41	1.12	66	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.262	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	317.23	138.25	50	1.00	0.90	1.33	1.05	63	0.85	53	56.03	0.50	1.20	65	NL	1.00	0.85	0.60	0.88	2.00	NL	0.69	0.246	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	344.68	150.99	55	1.00	0.90	1.33	1.05	69	0.81	56	67.97	0.50	1.20	68	NL	1.00	0.85	0.60	0.85	3.00	NL	0.65	0.230	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	372.13	163.73	57	1.00	0.90	1.33	1.05	72	0.78	56	63.37	0.50	1.20	68	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.215	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	399.58	176.47	67	1.00	0.90	1.33	1.05	84	0.75	63	72.10	0.50	1.20	77	NL	1.00	0.85	0.60	0.80	5.00	NL	0.57	0.200	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	427.03	189.21	75	1.00	0.90	1.33	1.05	94	0.73	69	65.10	0.50	1.20	83	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.185	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	454.48	201.95	87	1.00	0.90	1.33	1.05	109	0.70	77	80.40	0.50	1.20	93	NL	1.00	0.85	0.60	0.75	7.00	NL	0.49	0.171	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	481.93	214.69	100	1.00	0.90	1.33	1.05	126	0.68	86	60.74	0.50	1.20	103	NL	1.00	0.85	0.60	0.74	8.00	NL	0.45	0.156	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	513.95	229.56	100	1.00	0.90	1.33	1.05	126	0.66	83	70.97	0.50	1.20	100	NL	1.00	0.85	0.60	0.72	9.00	NL	0.40	0.140	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	532.25	238.05	100	1.00	0.90	1.33	1.05	126	0.65	81	61.21	0.50	1.20	98	NL	1.00	0.85	0.60	0.71	10.00	NL	0.37	0.130	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-93
Chainage	9+820

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Whiteish, fine-grained silty sand with Gravel (SM)	0.00	5.25	16.60	6.79
2	Medium Dense, Brownish to yellowish, fine-grained silty sand with Grave	5.25	13.00	17.15	7.34
3	Dense, Brownish, fine-grained silty sand(SM)	13.00	18.25	18.15	8.34
4	Very Dense, Brownish to yellowish, fine-grained silty sand (SM)	18.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-	-
1	0.00	2.50	1.25	20.75	8.49	7	0.75	0.90	1.33	1.05	7	1.70	11	19.84	3.59	1.08	16	0.17	1.00	0.10	0.80	1.64	1.00	0.27	0.99	0.378	0.72	Liquefiable Soil
2	2.50	4.00	3.25	53.95	22.08	9	0.80	0.90	1.33	1.05	9	1.70	15	7.27	0.16	1.01	16	0.17	1.00	0.17	0.80	1.35	1.00	0.23	0.98	0.372	0.61	Liquefiable Soil
3	4.00	5.50	4.75	78.85	32.27	10	0.85	0.90	1.33	1.05	11	1.70	18	23.60	4.13	1.10	24	0.28	1.00	0.19	0.80	1.25	1.00	0.35	0.96	0.367	0.94	Liquefiable Soil
4	5.50	7.00	6.25	104.30	43.01	12	0.95	0.90	1.33	1.05	14	1.52	22	29.11	4.64	1.15	30	0.45	1.00	0.25	0.80	1.18	1.00	0.53	0.95	0.360	1.47	Non Liquefiable Soil
5	7.00	8.50	7.75	130.03	54.02	16	0.95	0.90	1.33	1.05	19	1.36	26	29.11	4.64	1.15	34	NL	1.00	0.32	0.80	1.13	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	155.75	65.04	27	0.95	0.90	1.33	1.05	32	1.24	40	28.90	4.63	1.15	50	NL	1.00	0.53	0.74	1.12	1.00	NL	0.93	0.347	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	181.48	76.05	30	1.00	0.90	1.33	1.05	38	1.15	43	25.60	4.35	1.12	53	NL	1.00	0.61	0.69	1.09	1.00	NL	0.89	0.330	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	207.20	87.07	27	1.00	0.90	1.33	1.05	34	1.07	36	25.60	4.35	1.12	45	NL	1.00	0.55	0.72	1.04	1.00	NL	0.85	0.314	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	233.68	98.83	31	1.00	0.90	1.33	1.05	39	1.01	39	23.85	4.16	1.11	48	NL	1.00	0.63	0.68	1.00	1.00	NL	0.81	0.298	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	260.90	111.35	41	1.00	0.90	1.33	1.05	52	0.95	49	41.70	0.50	1.20	59	NL	1.00	0.85	0.60	0.96	1.00	NL	0.77	0.280	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	288.13	123.86	48	1.00	0.90	1.33	1.05	60	0.90	54	22.40	3.98	1.10	63	NL	1.00	0.85	0.60	0.92	1.00	NL	0.73	0.264	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	315.35	136.38	54	1.00	0.90	1.33	1.05	68	0.86	58	32.04	4.83	1.17	73	NL	1.00	0.85	0.60	0.88	2.00	NL	0.69	0.248	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	344.60	150.92	63	1.00	0.90	1.33	1.05	79	0.81	64	30.08	4.71	1.15	79	NL	1.00	0.85	0.60	0.85	3.00	NL	0.65	0.230	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	373.85	165.46	67	1.00	0.90	1.33	1.05	84	0.78	65	32.24	4.84	1.17	82	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.214	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	403.10	180.00	100	1.00	0.90	1.33	1.05	126	0.75	94	19.60	3.54	1.08	104	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.198	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	432.35	194.54	100	1.00	0.90	1.33	1.05	126	0.72	90	27.99	4.56	1.14	107	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.183	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	461.60	209.08	100	1.00	0.90	1.33	1.05	126	0.69	87	20.35	3.67	1.08	98	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.168	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	490.85	223.62	100	1.00	0.90	1.33	1.05	126	0.67	84	28.26	4.58	1.14	100	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.153	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	524.98	240.58	100	1.00	0.90	1.33	1.05	126	0.64	81	25.80	4.37	1.12	95	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.136	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	544.48	250.28	100	1.00	0.90	1.33	1.05	126	0.63	79	25.62	4.35	1.12	93	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.127	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-95
Chainage	10+044

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Whiteish, fine-grained silty sand with Gravel (SM)	0.00	4.00	16.60	6.79
2	Medium Dense, Gray, fine-grained silty sand with Gravel (SM)	4.00	12.25	17.15	7.34
3	Dense, Gray to Brownish, fine-grained silty sand(SM)	12.25	21.25	18.15	8.34
4	Hard , Brown Yellowish to Brownish , fine-grained inorganic silt of low Pl	21.25	26.25	18.30	8.49
5	Very Dense, Brown yellow to Brownish, fine-grained silty sand(S	26.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.75	8.49	7	0.75	0.90	1.33	1.05	7	1.70	11	26.22	4.41	1.12	17	0.18	1.00	0.10	0.80	1.64	1.00	0.30	0.99	0.378	0.78	Liquefiable Soil
2	2.50	4.00	3.25	53.95	22.08	8	0.80	0.90	1.33	1.05	8	1.70	14	26.22	4.41	1.12	20	0.21	1.00	0.15	0.80	1.35	1.00	0.29	0.98	0.372	0.77	Liquefiable Soil
3	4.00	5.50	4.75	79.26	32.68	12	0.85	0.90	1.33	1.05	13	1.70	22	19.36	3.50	1.08	27	0.34	1.00	0.22	0.80	1.25	1.00	0.42	0.96	0.365	1.15	Liquefiable Soil
4	5.50	7.00	6.25	104.99	43.70	17	0.95	0.90	1.33	1.05	20	1.51	31	40.82	0.50	1.20	37	NL	1.00	0.34	0.80	1.18	1.00	NL	0.95	0.357	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	130.71	54.71	20	0.95	0.90	1.33	1.05	24	1.35	32	24.55	4.24	1.11	40	NL	1.00	0.40	0.80	1.13	1.00	NL	0.94	0.351	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	156.44	65.73	29	0.95	0.90	1.33	1.05	35	1.23	43	24.55	4.24	1.11	52	NL	1.00	0.57	0.72	1.13	1.00	NL	0.93	0.345	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	182.16	76.74	29	1.00	0.90	1.33	1.05	36	1.14	42	23.23	4.09	1.10	50	NL	1.00	0.59	0.70	1.08	1.00	NL	0.89	0.328	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	207.89	87.76	33	1.00	0.90	1.33	1.05	41	1.07	44	29.60	4.68	1.15	56	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.313	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	235.11	100.27	35	1.00	0.90	1.33	1.05	44	1.00	44	24.63	4.25	1.11	53	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.295	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	262.34	112.79	39	1.00	0.90	1.33	1.05	49	0.94	46	29.44	4.67	1.15	58	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.278	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	289.56	125.30	41	1.00	0.90	1.33	1.05	52	0.89	46	21.20	3.81	1.09	54	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.262	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	316.79	137.82	45	1.00	0.90	1.33	1.05	57	0.85	48	39.30	0.50	1.20	58	NL	1.00	0.85	0.60	0.88	2.00	NL	0.69	0.246	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	344.01	150.33	50	1.00	0.90	1.33	1.05	63	0.82	51	20.00	3.61	1.08	59	NL	1.00	0.85	0.60	0.85	3.00	NL	0.65	0.231	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	371.24	162.85	52	1.00	0.90	1.33	1.05	65	0.78	51	34.10	4.94	1.19	66	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.216	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	398.69	175.59	56	1.00	0.90	1.33	1.05	70	0.75	53	71.04	0.50	1.20	64	NL	1.00	0.85	0.60	0.80	5.00	NL	0.57	0.201	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	426.14	188.33	100	1.00	0.90	1.33	1.05	126	0.73	92	65.80	0.50	1.20	110	NL	1.00	0.85	0.60	0.78	6.00	NL	0.53	0.186	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	453.59	201.07	100	1.00	0.90	1.33	1.05	126	0.71	89	63.20	0.50	1.20	107	NL	1.00	0.85	0.60	0.76	7.00	NL	0.49	0.171	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	482.24	215.01	100	1.00	0.90	1.33	1.05	126	0.68	86	48.16	0.50	1.20	103	NL	1.00	0.85	0.60	0.74	8.00	NL	0.45	0.156	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	516.36	231.97	100	1.00	0.90	1.33	1.05	126	0.66	83	18.10	3.25	1.07	91	NL	1.00	0.85	0.60	0.71	9.00	NL	0.40	0.139	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	535.86	241.66	100	1.00	0.90	1.33	1.05	126	0.64	81	47.30	0.50	1.20	98	NL	1.00	0.85	0.60	0.70	10.00	NL	0.37	0.129	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-96
Chainage	10+125

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Whiteish to brownish, fine-grained silty sand wi	0.00	8.25	17.65	7.84
2	Very stiff, Yellowish, fine-grained inorganic silt of low Plasticity with sar	8.25	11.25	17.75	7.94
3	Dense, Yellowish brown to Brownish, fine-grained silty sand(SM)	11.25	16.00	18.15	8.34
4	Very Dense, Brownish to yellowish, fine-grained silty sand with Gravel(SM	16.00	23.25	19.50	9.69
5	Very Dense, yellowish to Brownish, fine-grained silty sand(SM)	23.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	22.06	9.80	5	0.75	0.90	1.33	1.05	5	1.70	8	21.66	3.88	1.09	13	0.14	1.00	0.03	0.80	1.59	1.00	0.22	0.99	0.348	0.63	Liquefiable Soil
2	2.50	4.00	3.25	57.36	25.49	7	0.80	0.90	1.33	1.05	7	1.70	12	21.66	3.88	1.09	17	0.18	1.00	0.11	0.80	1.31	1.00	0.24	0.98	0.342	0.69	Liquefiable Soil
3	4.00	5.50	4.75	83.84	37.26	9	0.85	0.90	1.33	1.05	10	1.64	16	20.15	3.64	1.08	21	0.22	1.00	0.17	0.80	1.22	1.00	0.27	0.96	0.338	0.81	Liquefiable Soil
4	5.50	7.00	6.25	110.31	49.02	14	0.95	0.90	1.33	1.05	17	1.43	24	26.01	4.39	1.12	31	NL	1.00	0.28	0.80	1.15	1.00	NL	0.95	0.334	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	136.79	60.79	17	0.95	0.90	1.33	1.05	20	1.28	26	26.01	4.39	1.12	34	NL	1.00	0.34	0.80	1.10	1.00	NL	0.94	0.330	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	163.36	72.65	20	0.95	0.90	1.33	1.05	24	1.17	28	71.10	0.50	1.20	34	NL	1.00	0.40	0.80	1.07	1.00	NL	0.93	0.326	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	189.99	84.57	24	1.00	0.90	1.33	1.05	30	1.09	33	74.52	0.50	1.20	40	NL	1.00	0.49	0.75	1.04	1.00	NL	0.89	0.311	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	217.01	96.88	33	1.00	0.90	1.33	1.05	41	1.02	42	35.39	0.50	1.20	51	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.296	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.24	109.40	37	1.00	0.90	1.33	1.05	47	0.96	44	25.74	4.36	1.12	54	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.281	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.46	121.91	44	1.00	0.90	1.33	1.05	55	0.91	50	31.94	4.82	1.17	63	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.266	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	299.70	135.44	52	1.00	0.90	1.33	1.05	65	0.86	56	24.78	4.27	1.11	67	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	328.95	149.98	55	1.00	0.90	1.33	1.05	69	0.82	56	29.19	4.65	1.15	69	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.235	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	358.20	164.52	67	1.00	0.90	1.33	1.05	84	0.78	66	28.00	4.56	1.14	79	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.220	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	387.45	179.06	73	1.00	0.90	1.33	1.05	92	0.75	69	28.09	4.57	1.14	83	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.205	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	416.70	193.60	79	1.00	0.90	1.33	1.05	99	0.72	71	25.22	4.31	1.12	84	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.190	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	445.95	208.14	100	1.00	0.90	1.33	1.05	126	0.69	87	22.91	4.05	1.10	100	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.176	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	475.20	222.68	100	1.00	0.90	1.33	1.05	126	0.67	84	24.79	4.27	1.11	98	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	504.45	237.22	100	1.00	0.90	1.33	1.05	126	0.65	82	34.18	4.94	1.19	102	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	538.58	254.18	100	1.00	0.90	1.33	1.05	126	0.63	79	28.91	4.63	1.15	95	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	558.08	263.88	100	1.00	0.90	1.33	1.05	126	0.62	77	30.00	4.71	1.15	94	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-97
Chainage	10+222

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium stiff to stiff, Brownish, fine-grained inorganic silt of low Plastici	0.00	4.00	16.10	6.29
2	Medium Dense, brownish to greyish, fine-grained silty sand with Gravel (	4.00	7.00	17.15	7.34
3	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand w	7.00	11.25	18.30	8.49
4	Dense, Brownish, fine-grained silty sand(SM)	11.25	16.00	18.15	8.34
5	Very Dense, Brownish to Brownish Gray, fine-grained silty sand(SM)	16.00	23.25	19.50	9.69
6	Hard, Brownish Gray to brownish, fine-grained inorganic silt of low Plas	23.25	26.25	18.30	8.49
7	Very Dense, Brownish, fine-grained silty sand(SM)	26.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.13	7.87	7	0.75	0.90	1.33	1.05	7	1.70	11	70.43	0.50	1.20	14	0.15	1.00	0.10	0.80	1.66	1.00	0.25	0.99	0.395	0.63	Liquefiable Soil
2	2.50	4.00	3.25	52.33	20.45	9	0.80	0.90	1.33	1.05	9	1.70	15	70.43	0.50	1.20	19	0.20	1.00	0.17	0.80	1.37	1.00	0.28	0.98	0.389	0.72	Liquefiable Soil
3	4.00	5.50	4.75	77.26	30.68	13	0.85	0.90	1.33	1.05	14	1.70	24	25.57	4.35	1.12	31	NL	1.00	0.24	0.80	1.27	1.00	NL	0.96	0.379	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	102.99	41.70	16	0.95	0.90	1.33	1.05	19	1.55	30	31.29	4.79	1.17	39	NL	1.00	0.32	0.80	1.19	1.00	NL	0.95	0.367	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	129.58	53.57	49	0.95	0.90	1.33	1.05	59	1.37	80	71.20	0.50	1.20	96	NL	1.00	0.85	0.60	1.28	1.00	NL	0.94	0.355	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.03	66.31	40	0.95	0.90	1.33	1.05	48	1.23	59	80.89	0.50	1.20	71	NL	1.00	0.85	0.60	1.18	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.48	79.05	44	1.00	0.90	1.33	1.05	55	1.12	62	69.70	0.50	1.20	75	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.78	91.64	46	1.00	0.90	1.33	1.05	58	1.04	60	47.05	0.50	1.20	73	NL	1.00	0.85	0.60	1.04	1.00	NL	0.85	0.305	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	239.00	104.16	49	1.00	0.90	1.33	1.05	62	0.98	60	20.96	3.77	1.09	69	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.289	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	266.23	116.67	48	1.00	0.90	1.33	1.05	60	0.93	56	40.80	0.50	1.20	68	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.273	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	294.46	130.20	52	1.00	0.90	1.33	1.05	65	0.88	57	28.26	4.58	1.14	70	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.256	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	323.71	144.74	56	1.00	0.90	1.33	1.05	70	0.83	59	22.60	4.01	1.10	68	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.240	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	352.96	159.28	60	1.00	0.90	1.33	1.05	75	0.79	60	23.20	4.08	1.10	70	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.224	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	382.21	173.82	66	1.00	0.90	1.33	1.05	83	0.76	63	34.50	4.95	1.19	80	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.208	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	411.46	188.36	78	1.00	0.90	1.33	1.05	98	0.73	71	26.18	4.41	1.12	85	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.193	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	440.71	202.90	100	1.00	0.90	1.33	1.05	126	0.70	88	66.41	0.50	1.20	106	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	469.96	217.44	100	1.00	0.90	1.33	1.05	126	0.68	85	75.23	0.50	1.20	103	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	499.21	231.98	100	1.00	0.90	1.33	1.05	126	0.66	83	34.01	4.93	1.19	103	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	533.34	248.94	100	1.00	0.90	1.33	1.05	126	0.63	80	26.28	4.41	1.12	94	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	552.84	258.64	100	1.00	0.90	1.33	1.05	126	0.62	78	33.03	4.88	1.18	97	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-98
Chainage	10+328

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Greyish, fine-grained silty sand with Gravel (SM)	0.00	6.25	16.60	6.79
2	Medium Stiff to Stiff, Brownish, fine-grained inorganic silt of low Plastici	6.25	11.25	16.10	6.29
3	Dense, Brownish, fine-grained silty sand(SM)	11.25	18.25	18.15	8.34
4	Very Dense, Brownish, fine-grained silty sand(SM)	18.25	26.25	19.50	9.69
5	Very Dense, Brownish Gray, fine-grained silty sand(SM)	26.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.75	8.49	6	0.75	0.90	1.33	1.05	6	1.70	10	20.91	3.76	1.09	14	0.15	1.00	0.06	0.80	1.64	1.00	0.25	0.99	0.378	0.66	Liquefiable Soil
2	2.50	4.00	3.25	53.95	22.08	7	0.80	0.90	1.33	1.05	7	1.70	12	20.91	3.76	1.09	17	0.18	1.00	0.11	0.80	1.35	1.00	0.24	0.98	0.372	0.65	Liquefiable Soil
3	4.00	5.50	4.75	78.85	32.27	7	0.85	0.90	1.33	1.05	7	1.70	13	29.56	4.68	1.15	19	0.21	1.00	0.13	0.80	1.25	1.00	0.26	0.96	0.367	0.71	Liquefiable Soil
4	5.50	7.00	6.25	103.75	42.46	12	0.95	0.90	1.33	1.05	14	1.53	22	16.40	2.87	1.06	26	0.32	1.00	0.25	0.80	1.19	1.00	0.37	0.95	0.363	1.03	Liquefiable Soil
5	7.00	8.50	7.75	127.90	51.90	16	0.95	0.90	1.33	1.05	19	1.39	27	71.56	0.50	1.20	32	NL	1.00	0.32	0.80	1.14	1.00	NL	0.94	0.362	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	152.05	61.34	13	0.95	0.90	1.33	1.05	16	1.28	20	72.16	0.50	1.20	24	0.28	1.00	0.27	0.80	1.10	1.00	0.31	0.93	0.359	0.85	Liquefiable Soil
7	10.00	11.50	10.75	176.20	70.78	15	1.00	0.90	1.33	1.05	19	1.19	22	72.16	0.50	1.20	27	0.35	1.00	0.32	0.80	1.07	1.00	0.37	0.89	0.344	1.09	Liquefiable Soil
8	11.50	13.00	12.25	202.40	82.27	26	1.00	0.90	1.33	1.05	33	1.10	36	19.44	3.52	1.08	42	NL	1.00	0.53	0.73	1.05	1.00	NL	0.85	0.325	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	229.63	94.78	31	1.00	0.90	1.33	1.05	39	1.03	40	29.60	4.68	1.15	51	NL	1.00	0.63	0.68	1.02	1.00	NL	0.81	0.305	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	256.85	107.30	40	1.00	0.90	1.33	1.05	50	0.97	49	31.40	4.79	1.17	61	NL	1.00	0.85	0.60	0.97	1.00	NL	0.77	0.286	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	284.08	119.81	45	1.00	0.90	1.33	1.05	57	0.91	52	24.30	4.21	1.11	62	NL	1.00	0.85	0.60	0.93	1.00	NL	0.73	0.269	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	311.30	132.33	51	1.00	0.90	1.33	1.05	64	0.87	56	22.97	4.05	1.10	65	NL	1.00	0.85	0.60	0.89	2.00	NL	0.69	0.252	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	340.55	146.87	56	1.00	0.90	1.33	1.05	70	0.83	58	19.80	3.58	1.08	66	NL	1.00	0.85	0.60	0.86	3.00	NL	0.65	0.234	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	369.80	161.41	67	1.00	0.90	1.33	1.05	84	0.79	66	23.99	4.18	1.11	78	NL	1.00	0.85	0.60	0.83	4.00	NL	0.61	0.217	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	399.05	175.95	100	1.00	0.90	1.33	1.05	126	0.75	95	32.26	4.84	1.17	116	NL	1.00	0.85	0.60	0.80	5.00	NL	0.57	0.200	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	428.30	190.49	52	1.00	0.90	1.33	1.05	65	0.72	47	18.03	3.24	1.07	54	NL	1.00	0.85	0.60	0.77	6.00	NL	0.53	0.185	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	457.55	205.03	100	1.00	0.90	1.33	1.05	126	0.70	88	21.40	3.84	1.09	99	NL	1.00	0.85	0.60	0.75	7.00	NL	0.49	0.169	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	486.80	219.57	100	1.00	0.90	1.33	1.05	126	0.67	85	24.70	4.26	1.11	99	NL	1.00	0.85	0.60	0.73	8.00	NL	0.45	0.154	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	520.93	236.53	100	1.00	0.90	1.33	1.05	126	0.65	82	31.03	4.77	1.16	100	NL	1.00	0.85	0.60	0.71	9.00	NL	0.40	0.137	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	540.43	246.23	100	1.00	0.90	1.33	1.05	126	0.64	80	22.70	4.02	1.10	92	NL	1.00	0.85	0.60	0.70	10.00	NL	0.37	0.128	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-99
Chainage	10+428

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish to Greyish, fine-grained silty sand (SM	0.00	7.00	17.65	7.84
2	Dense, Grey Brownish to Brownish, fine-grained silty sand (SM)	7.00	16.00	18.15	8.34
3	Very Dense, Brownish to Brownish Grey, fine-grained silty sand (SM)	16.00	22.00	19.50	9.69
4	Very Dense, Brownish Grey to Brownish, fine-grained silty sand with Grav	22.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-	-
1	0.00	2.50	1.25	22.06	9.80	9	0.75	0.90	1.33	1.05	8	1.70	14	20.86	3.76	1.09	19	0.21	1.00	0.16	0.80	1.59	1.00	0.33	0.99	0.348	0.95	Liquefiable Soil
2	2.50	4.00	3.25	57.36	25.49	16	0.80	0.90	1.33	1.05	16	1.70	27	20.86	3.76	1.09	33	NL	1.00	0.27	0.80	1.31	1.00	NL	0.98	0.342	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	83.84	37.26	20	0.85	0.90	1.33	1.05	21	1.64	35	26.00	4.39	1.12	44	NL	1.00	0.36	0.80	1.22	1.00	NL	0.96	0.338	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	110.31	49.02	25	0.95	0.90	1.33	1.05	30	1.43	43	23.45	4.11	1.10	51	NL	1.00	0.49	0.76	1.19	1.00	NL	0.95	0.334	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	137.16	61.16	32	0.95	0.90	1.33	1.05	38	1.28	49	24.80	4.27	1.11	59	NL	1.00	0.62	0.69	1.17	1.00	NL	0.94	0.329	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	164.39	73.68	36	0.95	0.90	1.33	1.05	43	1.17	50	19.39	3.51	1.08	57	NL	1.00	0.85	0.60	1.13	1.00	NL	0.93	0.323	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	191.61	86.19	40	1.00	0.90	1.33	1.05	50	1.08	54	18.74	3.38	1.07	61	NL	1.00	0.85	0.60	1.06	1.00	NL	0.89	0.308	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	218.84	98.71	43	1.00	0.90	1.33	1.05	54	1.01	54	30.83	4.76	1.16	68	NL	1.00	0.85	0.60	1.01	1.00	NL	0.85	0.293	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	246.06	111.22	46	1.00	0.90	1.33	1.05	58	0.95	55	30.83	4.76	1.16	68	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.278	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	273.29	123.74	48	1.00	0.90	1.33	1.05	60	0.90	54	30.40	4.73	1.16	68	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.264	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	301.53	137.26	51	1.00	0.90	1.33	1.05	64	0.85	55	23.44	4.11	1.10	64	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.249	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.78	151.80	55	1.00	0.90	1.33	1.05	69	0.81	56	30.19	4.72	1.16	70	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.03	166.34	60	1.00	0.90	1.33	1.05	75	0.78	58	16.40	2.87	1.06	65	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.28	180.88	67	1.00	0.90	1.33	1.05	84	0.74	63	30.00	4.71	1.15	77	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.204	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	418.53	195.42	100	1.00	0.90	1.33	1.05	126	0.72	90	26.16	4.40	1.12	105	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	447.78	209.96	100	1.00	0.90	1.33	1.05	126	0.69	87	24.60	4.25	1.11	101	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	477.03	224.50	100	1.00	0.90	1.33	1.05	126	0.67	84	24.18	4.20	1.11	97	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.161	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	506.28	239.04	100	1.00	0.90	1.33	1.05	126	0.65	81	18.53	3.34	1.07	90	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	540.40	256.01	100	1.00	0.90	1.33	1.05	126	0.62	79	33.33	4.90	1.18	98	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	559.90	265.70	100	1.00	0.90	1.33	1.05	126	0.61	77	29.42	4.67	1.15	93	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km)
Stretch:	Noida Sector-142 to Botanical Garden (0+000 to 11+600km)

Site Details	
Borehole No.	BH-100
Chainage	10+542

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish, fine-grained silty sand with Gravel (SM)	0.00	5.25	16.60	6.79
2	Medium Dense, Brownish, fine-grained silty sand with Gravel (SM)	5.25	11.25	17.15	7.34
3	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand wi	11.25	14.25	18.30	8.49
4	Dense, Brownish to Yellowish, fine-grained silty sand with Gravel (SM)	14.25	19.00	18.15	8.34
5	Very Dense, Yellowish to Brownish, fine-grained inorganic silt of low Pla	19.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-	-
1	0.00	2.50	1.25	20.75	8.49	7	0.75	0.90	1.33	1.05	7	1.70	11	28.68	4.61	1.14	17	0.19	1.00	0.10	0.80	1.64	1.00	0.30	0.99	0.378	0.80	Liquefiable Soil
2	2.50	4.00	3.25	53.95	22.08	9	0.80	0.90	1.33	1.05	9	1.70	15	28.68	4.61	1.14	22	0.24	1.00	0.17	0.80	1.35	1.00	0.33	0.98	0.372	0.89	Liquefiable Soil
3	4.00	5.50	4.75	78.85	32.27	10	0.85	0.90	1.33	1.05	11	1.70	18	24.45	4.23	1.11	24	0.28	1.00	0.19	0.80	1.25	1.00	0.35	0.96	0.367	0.96	Liquefiable Soil
4	5.50	7.00	6.25	104.30	43.01	13	0.95	0.90	1.33	1.05	16	1.52	24	30.58	4.74	1.16	32	NL	1.00	0.27	0.80	1.18	1.00	NL	0.95	0.360	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	130.03	54.02	16	0.95	0.90	1.33	1.05	19	1.36	26	30.58	4.74	1.16	35	NL	1.00	0.32	0.80	1.13	1.00	NL	0.94	0.353	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	155.75	65.04	17	0.95	0.90	1.33	1.05	20	1.24	25	49.98	0.50	1.20	31	NL	1.00	0.34	0.80	1.09	1.00	NL	0.93	0.347	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	181.48	76.05	22	1.00	0.90	1.33	1.05	28	1.15	32	31.20	4.78	1.16	42	NL	1.00	0.46	0.77	1.06	1.00	NL	0.89	0.330	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.35	88.22	32	1.00	0.90	1.33	1.05	40	1.06	43	58.09	0.50	1.20	52	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.312	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	235.80	100.96	34	1.00	0.90	1.33	1.05	43	1.00	43	73.69	0.50	1.20	52	NL	1.00	0.85	0.60	1.00	1.00	NL	0.81	0.294	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	263.10	113.55	41	1.00	0.90	1.33	1.05	52	0.94	48	23.81	4.16	1.11	58	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.277	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	290.33	126.06	47	1.00	0.90	1.33	1.05	59	0.89	53	28.70	4.62	1.14	65	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.261	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	317.55	138.58	37	1.00	0.90	1.33	1.05	47	0.85	40	21.53	3.86	1.09	47	NL	1.00	0.85	0.60	0.88	2.00	NL	0.69	0.245	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	345.79	152.11	44	1.00	0.90	1.33	1.05	55	0.81	45	71.28	0.50	1.20	54	NL	1.00	0.85	0.60	0.85	3.00	NL	0.65	0.229	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	375.04	166.65	52	1.00	0.90	1.33	1.05	65	0.77	51	64.50	0.50	1.20	61	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.213	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	404.29	181.19	53	1.00	0.90	1.33	1.05	67	0.74	49	67.89	0.50	1.20	60	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.197	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	433.54	195.73	100	1.00	0.90	1.33	1.05	126	0.71	90	61.12	0.50	1.20	108	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.182	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	462.79	210.27	100	1.00	0.90	1.33	1.05	126	0.69	87	72.00	0.50	1.20	105	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.167	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	492.04	224.81	100	1.00	0.90	1.33	1.05	126	0.67	84	61.52	0.50	1.20	101	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.152	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	526.16	241.77	100	1.00	0.90	1.33	1.05	126	0.64	81	64.71	0.50	1.20	97	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.136	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	545.66	251.46	100	1.00	0.90	1.33	1.05	126	0.63	79	60.56	0.50	1.20	96	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.126	NL	Non Liquefiable Soil

B.12. Zone 12: CH: 10+540 km to 11+400 km (BH-101 to BH-109)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-101	0.00	2.50	8	8	13	18	0.31	0.37	0.86	Liquefiable Soil
BH-101	2.50	4.00	11	11	19	26	0.41	0.36	1.15	Liquefiable Soil
BH-102	0.00	2.50	9	8	14	21	0.37	0.38	0.98	Liquefiable Soil
BH-102	2.50	4.00	7	7	12	17	0.25	0.37	0.67	Liquefiable Soil
BH-102	4.00	5.50	8	9	15	20	0.27	0.37	0.74	Liquefiable Soil
BH-102	5.50	7.00	10	12	18	24	0.33	0.37	0.89	Liquefiable Soil
BH-102	7.00	8.50	14	17	23	28	0.42	0.36	1.18	Liquefiable Soil
BH-103	0.00	2.50	7	7	11	17	0.30	0.38	0.79	Liquefiable Soil
BH-103	2.50	4.00	10	10	17	24	0.37	0.37	0.98	Liquefiable Soil
BH-104	0.00	2.50	6	6	10	15	0.27	0.38	0.70	Liquefiable Soil
BH-104	2.50	4.00	7	7	12	18	0.26	0.37	0.69	Liquefiable Soil
BH-104	4.00	5.50	9	10	16	24	0.34	0.37	0.92	Liquefiable Soil
BH-105	0.00	2.50	6	6	10	15	0.25	0.38	0.67	Liquefiable Soil
BH-105	2.50	4.00	9	9	15	21	0.31	0.37	0.82	Liquefiable Soil
BH-106	0.00	2.50	7	7	11	18	0.31	0.37	0.84	Liquefiable Soil
BH-107	0.00	2.50	5	5	8	10	0.19	0.39	0.48	Liquefiable Soil
BH-107	2.50	4.00	6	6	10	13	0.19	0.39	0.49	Liquefiable Soil
BH-107	4.00	5.50	9	10	16	20	0.28	0.38	0.72	Liquefiable Soil
BH-108	0.00	2.50	5	5	8	13	0.22	0.38	0.59	Liquefiable Soil
BH-108	2.50	4.00	7	7	12	17	0.24	0.37	0.65	Liquefiable Soil
BH-108	4.00	5.50	10	11	18	24	0.34	0.37	0.91	Liquefiable Soil
BH-109	0.00	2.50	10	9	16	22	0.40	0.37	1.10	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-101
Chainage	10+631

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish to Brownish Gray, fine-grained silty sa	0.00	8.25	17.00	7.19
2	Dense, Greyish to Brownish fine-grained silty sand and Gravel (SM)	8.25	16.00	19.00	9.19
3	Very Dense, Brownish Gray to Brownish, fine-grained silty sand and Gra	16.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	8	0.75	0.90	1.33	1.05	8	1.70	13	23.15	4.08	1.10	18	0.19	1.00	0.13	0.80	1.62	1.00	0.31	0.99	0.365	0.86	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	11	0.80	0.90	1.33	1.05	11	1.70	19	27.17	4.49	1.13	26	0.31	1.00	0.20	0.80	1.34	1.00	0.41	0.98	0.360	1.15	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	16	0.85	0.90	1.33	1.05	17	1.70	29	27.17	4.49	1.13	37	NL	1.00	0.29	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	19	0.95	0.90	1.33	1.05	23	1.49	34	18.01	3.24	1.07	39	NL	1.00	0.38	0.80	1.17	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	21	0.95	0.90	1.33	1.05	25	1.34	34	18.01	3.24	1.07	39	NL	1.00	0.41	0.79	1.13	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.25	68.54	33	0.95	0.90	1.33	1.05	39	1.21	48	33.59	4.91	1.18	61	NL	1.00	0.64	0.68	1.13	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.75	82.33	35	1.00	0.90	1.33	1.05	44	1.10	48	27.44	4.52	1.13	59	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.316	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	216.25	96.12	39	1.00	0.90	1.33	1.05	49	1.02	50	29.02	4.64	1.15	62	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.297	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.75	109.91	46	1.00	0.90	1.33	1.05	58	0.95	55	29.12	4.65	1.15	68	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.280	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	273.25	123.70	48	1.00	0.90	1.33	1.05	60	0.90	54	38.70	0.50	1.20	66	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.264	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	302.13	137.86	52	1.00	0.90	1.33	1.05	65	0.85	56	26.13	4.40	1.12	67	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.248	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	331.38	152.40	58	1.00	0.90	1.33	1.05	73	0.81	59	30.77	4.76	1.16	73	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.63	166.94	68	1.00	0.90	1.33	1.05	85	0.77	66	29.91	4.70	1.15	81	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.88	181.48	100	1.00	0.90	1.33	1.05	126	0.74	93	24.35	4.22	1.11	108	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	419.13	196.02	100	1.00	0.90	1.33	1.05	126	0.71	90	19.47	3.52	1.08	100	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	448.38	210.56	100	1.00	0.90	1.33	1.05	126	0.69	87	26.11	4.40	1.12	102	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	477.63	225.10	100	1.00	0.90	1.33	1.05	126	0.67	84	26.92	4.47	1.13	99	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.161	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	506.88	239.64	100	1.00	0.90	1.33	1.05	126	0.65	81	24.93	4.28	1.11	95	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	541.00	256.61	100	1.00	0.90	1.33	1.05	126	0.62	78	31.40	4.79	1.17	96	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	560.50	266.30	100	1.00	0.90	1.33	1.05	126	0.61	77	25.70	4.36	1.12	91	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.122	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-102
Chainage	10+709

Density Profile					
Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Whitish to Brownish, fine-grained silty sand (SM)	0.00	6.25	16.50	6.69
2	Stiff to Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity w	6.25	11.25	17.25	7.44
3	Dense, Yellowish to Brownish, fine-grained silty sand (SM)	11.25	15.25	19.00	9.19
4	Hard, Brownish to Yellowish, fine-grained inorganic silt of low Plasticity	15.25	20.25	18.30	8.49
5	Very Dense, Brownish, fine-grained silty sand and Gravel (SM)	20.25	27.25	19.50	9.69
6	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand (N	27.25	30.50	18.30	8.49

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	9	0.75	0.90	1.33	1.05	8	1.70	14	27.68	4.54	1.14	21	0.23	1.00	0.16	0.80	1.64	1.00	0.37	0.99	0.381	0.98	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	7	0.80	0.90	1.33	1.05	7	1.70	12	23.76	4.15	1.11	17	0.18	1.00	0.11	0.80	1.36	1.00	0.25	0.98	0.375	0.67	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	8	0.85	0.90	1.33	1.05	9	1.70	15	23.76	4.15	1.11	20	0.22	1.00	0.16	0.80	1.26	1.00	0.27	0.96	0.371	0.74	Liquefiable Soil
4	5.50	7.00	6.25	103.13	41.83	10	0.95	0.90	1.33	1.05	12	1.55	18	21.62	3.87	1.09	24	0.27	1.00	0.21	0.80	1.19	1.00	0.33	0.95	0.366	0.89	Liquefiable Soil
5	7.00	8.50	7.75	129.00	53.00	14	0.95	0.90	1.33	1.05	17	1.37	23	67.53	0.50	1.20	28	0.37	1.00	0.28	0.80	1.14	1.00	0.42	0.94	0.357	1.18	Liquefiable Soil
6	8.50	10.00	9.25	154.88	64.16	17	0.95	0.90	1.33	1.05	20	1.25	25	55.36	0.50	1.20	31	NL	1.00	0.34	0.80	1.09	1.00	NL	0.93	0.350	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	180.75	75.33	24	1.00	0.90	1.33	1.05	30	1.15	35	67.02	0.50	1.20	42	NL	1.00	0.49	0.75	1.07	1.00	NL	0.89	0.332	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.38	88.24	32	1.00	0.90	1.33	1.05	40	1.06	43	29.91	4.70	1.15	54	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.312	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	236.88	102.03	36	1.00	0.90	1.33	1.05	45	0.99	45	21.78	3.89	1.09	53	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.292	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	265.38	115.82	43	1.00	0.90	1.33	1.05	54	0.93	50	31.94	4.82	1.17	64	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.274	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	292.83	128.56	52	1.00	0.90	1.33	1.05	65	0.88	58	67.00	0.50	1.20	70	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.258	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	320.28	141.30	41	1.00	0.90	1.33	1.05	52	0.84	43	81.37	0.50	1.20	53	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.243	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	347.73	154.04	44	1.00	0.90	1.33	1.05	55	0.81	45	72.28	0.50	1.20	54	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.228	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	376.38	167.98	64	1.00	0.90	1.33	1.05	80	0.77	62	29.10	4.64	1.15	76	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.212	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	405.63	182.52	100	1.00	0.90	1.33	1.05	126	0.74	93	28.57	4.61	1.14	111	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.196	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	434.88	197.06	100	1.00	0.90	1.33	1.05	126	0.71	90	34.92	4.97	1.20	112	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.181	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	464.13	211.60	100	1.00	0.90	1.33	1.05	126	0.69	86	19.28	3.49	1.07	96	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.166	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	493.38	226.14	100	1.00	0.90	1.33	1.05	126	0.66	84	28.62	4.61	1.14	100	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.152	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	527.50	243.11	100	1.00	0.90	1.33	1.05	126	0.64	81	67.72	0.50	1.20	97	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.135	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	547.00	252.80	100	1.00	0.90	1.33	1.05	126	0.63	79	64.61	0.50	1.20	95	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.126	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-103
Chainage	10+821

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Greyish to Brownish, fine-grained silty sand (SM)	0.00	6.25	16.50	6.69
2	Medium Dense, Gray Brownish to Greyish, fine-grained silty sand (SM)	6.25	10.00	17.85	8.04
3	Hard, Greyish, fine-grained inorganic silt of low Plasticity with sand (ML	10.00	14.25	18.30	8.49
4	Dense, Brownish, fine-grained silty sand (SM)	14.25	18.25	19.00	9.19
5	Very Dense, Brownish, fine-grained silty sand and Gravel (SM)	18.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	7	0.75	0.90	1.33	1.05	7	1.70	11	27.20	4.50	1.13	17	0.18	1.00	0.10	0.80	1.64	1.00	0.30	0.99	0.381	0.79	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	10	0.80	0.90	1.33	1.05	10	1.70	17	27.20	4.50	1.13	24	0.27	1.00	0.18	0.80	1.36	1.00	0.37	0.98	0.375	0.98	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	16	0.85	0.90	1.33	1.05	17	1.70	29	20.70	3.73	1.08	35	NL	1.00	0.29	0.80	1.26	1.00	NL	0.96	0.371	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	103.13	41.83	19	0.95	0.90	1.33	1.05	23	1.55	35	20.70	3.73	1.08	42	NL	1.00	0.38	0.80	1.19	1.00	NL	0.95	0.366	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	129.90	53.90	25	0.95	0.90	1.33	1.05	30	1.36	41	24.20	4.20	1.11	49	NL	1.00	0.49	0.76	1.16	1.00	NL	0.94	0.354	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	156.68	65.96	29	0.95	0.90	1.33	1.05	35	1.23	43	24.89	4.28	1.11	52	NL	1.00	0.57	0.72	1.12	1.00	NL	0.93	0.344	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	183.79	78.37	33	1.00	0.90	1.33	1.05	41	1.13	47	62.86	0.50	1.20	57	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.325	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.24	91.11	40	1.00	0.90	1.33	1.05	50	1.05	53	69.86	0.50	1.20	64	NL	1.00	0.85	0.60	1.04	1.00	NL	0.85	0.306	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	238.69	103.85	43	1.00	0.90	1.33	1.05	54	0.98	53	66.66	0.50	1.20	64	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.289	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	266.84	117.29	49	1.00	0.90	1.33	1.05	62	0.92	57	31.21	4.78	1.16	71	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.272	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	295.34	131.08	50	1.00	0.90	1.33	1.05	63	0.87	55	24.59	4.25	1.11	65	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.255	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	323.84	144.87	59	1.00	0.90	1.33	1.05	74	0.83	62	33.10	4.89	1.18	78	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.239	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	353.09	159.41	66	1.00	0.90	1.33	1.05	83	0.79	66	28.00	4.56	1.14	79	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	382.34	173.95	71	1.00	0.90	1.33	1.05	89	0.76	68	37.90	0.50	1.20	82	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.208	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	411.59	188.49	100	1.00	0.90	1.33	1.05	126	0.73	92	26.61	4.44	1.13	108	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.193	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	440.84	203.03	100	1.00	0.90	1.33	1.05	126	0.70	88	33.12	4.89	1.18	109	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	470.09	217.57	100	1.00	0.90	1.33	1.05	126	0.68	85	32.13	4.84	1.17	105	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	499.34	232.11	100	1.00	0.90	1.33	1.05	126	0.66	82	33.28	4.90	1.18	102	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	533.46	249.07	100	1.00	0.90	1.33	1.05	126	0.63	80	17.80	3.19	1.07	88	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	552.96	258.76	100	1.00	0.90	1.33	1.05	126	0.62	78	28.63	4.61	1.14	94	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-104
Chainage	10+946

Density Profile					
Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Whitish to Brownish Gray, fine-grained silty sand (SM)	0.00	6.25	16.50	6.69
2	Stiff to Very Stiff, Whiteish to Yellowish, fine-grained inorganic silt of low	6.25	11.25	17.25	7.44
3	Dense, Dark Brownish to Yellowish, fine-grained silty sand (SM)	11.25	14.25	19.00	9.19
4	Hard, Yellowish to Brownish, fine-grained inorganic silt of low Plasticity	14.25	17.25	18.30	8.49
5	Very Dense, Brownish, fine-grained silty sand and Gravel (SM)	17.25	22.00	19.50	9.69
6	Very Dense, Yellowish to Brownish, fine-grained silty sa	22.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	26.27	4.41	1.12	15	0.16	1.00	0.06	0.80	1.64	1.00	0.27	0.99	0.381	0.70	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	7	0.80	0.90	1.33	1.05	7	1.70	12	26.27	4.41	1.12	18	0.19	1.00	0.11	0.80	1.36	1.00	0.26	0.98	0.375	0.69	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	9	0.85	0.90	1.33	1.05	10	1.70	16	31.09	4.78	1.16	24	0.27	1.00	0.17	0.80	1.26	1.00	0.34	0.96	0.371	0.92	Liquefiable Soil
4	5.50	7.00	6.25	103.13	41.83	13	0.95	0.90	1.33	1.05	16	1.55	24	31.09	4.78	1.16	33	NL	1.00	0.27	0.80	1.19	1.00	NL	0.95	0.366	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	129.00	53.00	17	0.95	0.90	1.33	1.05	20	1.37	28	72.22	0.50	1.20	34	NL	1.00	0.34	0.80	1.14	1.00	NL	0.94	0.357	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	154.88	64.16	20	0.95	0.90	1.33	1.05	24	1.25	30	81.20	0.50	1.20	36	NL	1.00	0.40	0.80	1.09	1.00	NL	0.93	0.350	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	180.75	75.33	23	1.00	0.90	1.33	1.05	29	1.15	33	68.22	0.50	1.20	40	NL	1.00	0.47	0.76	1.07	1.00	NL	0.89	0.332	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.38	88.24	34	1.00	0.90	1.33	1.05	43	1.06	45	36.32	0.50	1.20	55	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.312	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	236.88	102.03	37	1.00	0.90	1.33	1.05	47	0.99	46	31.70	4.81	1.17	59	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.292	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	264.68	115.12	45	1.00	0.90	1.33	1.05	57	0.93	53	67.96	0.50	1.20	64	NL	1.00	0.85	0.60	0.95	1.00	NL	0.77	0.275	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	292.13	127.86	52	1.00	0.90	1.33	1.05	65	0.88	58	77.99	0.50	1.20	70	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.259	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	320.78	141.80	54	1.00	0.90	1.33	1.05	68	0.84	57	29.58	4.68	1.15	70	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.242	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	350.03	156.34	64	1.00	0.90	1.33	1.05	80	0.80	64	24.32	4.22	1.11	76	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.226	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	379.28	170.88	66	1.00	0.90	1.33	1.05	83	0.76	63	29.75	4.69	1.15	78	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.210	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	408.53	185.42	100	1.00	0.90	1.33	1.05	126	0.73	92	30.09	4.71	1.16	111	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.195	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	437.78	199.96	100	1.00	0.90	1.33	1.05	126	0.71	89	31.51	4.80	1.17	109	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.180	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	467.03	214.50	100	1.00	0.90	1.33	1.05	126	0.68	86	32.78	4.87	1.18	106	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.165	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	496.28	229.04	100	1.00	0.90	1.33	1.05	126	0.66	83	29.63	4.68	1.15	100	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.151	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	530.40	246.01	100	1.00	0.90	1.33	1.05	126	0.64	80	17.86	3.20	1.07	89	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	549.90	255.70	100	1.00	0.90	1.33	1.05	126	0.63	79	31.93	4.82	1.17	97	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.125	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-105
Chainage	11+034

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Greyish, fine-grained silty sand (SM)	0.00	4.00	16.50	6.69
2	Medium Dense, Greyish, fine-grained silty sand (SM)	4.00	11.25	17.85	8.04
3	Dense, Gray Brownish, fine-grained silty sand (SM)	11.25	16.00	19.00	9.19
4	Very Dense, Gray Brownish to Brownish, fine-grained silty sand (SM)	16.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-					-	-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	6	0.75	0.90	1.33	1.05	6	1.70	10	22.32	3.97	1.10	15	0.16	1.00	0.06	0.80	1.64	1.00	0.25	0.99	0.381	0.67	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	9	0.80	0.90	1.33	1.05	9	1.70	15	22.32	3.97	1.10	21	0.23	1.00	0.17	0.80	1.36	1.00	0.31	0.98	0.375	0.82	Liquefiable Soil
3	4.00	5.50	4.75	79.39	32.81	14	0.85	0.90	1.33	1.05	15	1.70	25	24.16	4.20	1.11	32	NL	1.00	0.26	0.80	1.25	1.00	NL	0.96	0.364	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.16	44.87	25	0.95	0.90	1.33	1.05	30	1.49	45	30.00	4.71	1.15	56	NL	1.00	0.49	0.76	1.22	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.94	56.94	27	0.95	0.90	1.33	1.05	32	1.33	43	30.00	4.71	1.15	54	NL	1.00	0.53	0.74	1.16	1.00	NL	0.94	0.343	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.71	69.00	31	0.95	0.90	1.33	1.05	37	1.20	45	31.23	4.78	1.16	57	NL	1.00	0.60	0.70	1.12	1.00	NL	0.93	0.336	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	186.49	81.07	37	1.00	0.90	1.33	1.05	47	1.11	52	22.49	3.99	1.10	61	NL	1.00	0.85	0.60	1.09	1.00	NL	0.89	0.318	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	214.41	94.28	43	1.00	0.90	1.33	1.05	54	1.03	56	33.28	4.90	1.18	71	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.300	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	242.91	108.07	46	1.00	0.90	1.33	1.05	58	0.96	56	25.56	4.35	1.12	67	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.283	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.41	121.86	48	1.00	0.90	1.33	1.05	60	0.91	55	23.48	4.12	1.10	64	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.266	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	300.29	136.03	51	1.00	0.90	1.33	1.05	64	0.86	55	30.58	4.74	1.16	68	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.250	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	329.54	150.57	55	1.00	0.90	1.33	1.05	69	0.81	56	24.64	4.25	1.11	67	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	358.79	165.11	60	1.00	0.90	1.33	1.05	75	0.78	59	16.81	2.97	1.06	65	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.219	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	388.04	179.65	65	1.00	0.90	1.33	1.05	82	0.75	61	19.35	3.50	1.08	69	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.204	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	417.29	194.19	69	1.00	0.90	1.33	1.05	87	0.72	62	20.32	3.67	1.08	71	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.190	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	446.54	208.73	100	1.00	0.90	1.33	1.05	126	0.69	87	23.50	4.12	1.10	100	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.176	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	475.79	223.27	100	1.00	0.90	1.33	1.05	126	0.67	84	20.96	3.77	1.09	95	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.162	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	505.04	237.81	100	1.00	0.90	1.33	1.05	126	0.65	82	24.31	4.21	1.11	95	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.148	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	539.16	254.77	100	1.00	0.90	1.33	1.05	126	0.63	79	26.12	4.40	1.12	93	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.132	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	558.66	264.46	100	1.00	0.90	1.33	1.05	126	0.61	77	23.60	4.13	1.10	90	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-106
Chainage	11+134

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish to Greyish, fine-grained silty sand (SM	0.00	5.25	17.00	7.19
2	Stiff to Very Stiff, Brownish to Grey Brownish, fine-grained inorganic silt	5.25	10.00	17.25	7.44
3	Hard, Grey Brownish to Brownish, fine-grained inorganic silt of low Plas	10.00	14.25	18.30	8.49
4	Dense to Very Dense, Brownish, fine-grained silty sand (SM)	14.25	24.25	19.00	9.19
5	Very Dense, Brownish, fine-grained silty sand (SM)	24.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	7	0.75	0.90	1.33	1.05	7	1.70	11	30.61	4.75	1.16	18	0.19	1.00	0.10	0.80	1.62	1.00	0.31	0.99	0.365	0.84	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	12	0.80	0.90	1.33	1.05	12	1.70	21	31.44	4.80	1.17	29	0.40	1.00	0.21	0.80	1.34	1.00	0.53	0.98	0.360	1.48	Non Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	17	0.85	0.90	1.33	1.05	18	1.70	31	31.44	4.80	1.17	41	NL	1.00	0.31	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.50	45.21	21	0.95	0.90	1.33	1.05	25	1.49	37	22.60	4.01	1.10	45	NL	1.00	0.41	0.79	1.18	1.00	NL	0.95	0.350	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	132.38	56.37	28	0.95	0.90	1.33	1.05	33	1.33	45	70.89	0.50	1.20	54	NL	1.00	0.55	0.73	1.17	1.00	NL	0.94	0.345	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.25	67.54	31	0.95	0.90	1.33	1.05	37	1.22	45	70.89	0.50	1.20	55	NL	1.00	0.60	0.70	1.13	1.00	NL	0.93	0.340	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.91	79.49	34	1.00	0.90	1.33	1.05	43	1.12	48	71.02	0.50	1.20	58	NL	1.00	0.85	0.60	1.10	1.00	NL	0.89	0.322	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.36	92.23	40	1.00	0.90	1.33	1.05	50	1.04	52	63.52	0.50	1.20	63	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.304	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	239.81	104.97	43	1.00	0.90	1.33	1.05	54	0.98	53	71.28	0.50	1.20	64	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.288	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	267.96	118.41	47	1.00	0.90	1.33	1.05	59	0.92	54	47.98	0.50	1.20	66	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.271	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	296.46	132.20	51	1.00	0.90	1.33	1.05	64	0.87	56	25.89	4.38	1.12	67	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.254	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	324.96	145.99	57	1.00	0.90	1.33	1.05	72	0.83	59	36.78	0.50	1.20	72	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.238	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	353.46	159.78	60	1.00	0.90	1.33	1.05	75	0.79	60	23.59	4.13	1.10	70	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	381.96	173.57	67	1.00	0.90	1.33	1.05	84	0.76	64	24.60	4.25	1.11	75	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.208	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	410.46	187.36	72	1.00	0.90	1.33	1.05	90	0.73	66	28.23	4.58	1.14	80	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.194	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	438.96	201.15	100	1.00	0.90	1.33	1.05	126	0.71	89	38.43	0.50	1.20	107	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	468.21	215.69	100	1.00	0.90	1.33	1.05	126	0.68	86	20.67	3.73	1.08	96	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.165	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	497.46	230.23	100	1.00	0.90	1.33	1.05	126	0.66	83	27.94	4.56	1.14	99	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	531.59	247.19	100	1.00	0.90	1.33	1.05	126	0.64	80	24.40	4.22	1.11	93	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	551.09	256.89	100	1.00	0.90	1.33	1.05	126	0.62	78	24.97	4.29	1.11	92	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.125	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-107
Chainage	11+240

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Yellowish to Brownish, fine-grained inorganic silt o	0.00	5.25	16.20	6.39
2	Medium Dense, Brownish to Yellowish, fine-grained silty sand and Grave	5.25	8.25	17.85	8.04
3	Very Stiff, Yellowish, fine-grained inorganic silt of low Plasticity with sar	8.25	11.25	17.75	7.94
4	Dense, Yellowish to Brownish, fine-grained silty sand and Gravel (SM)	11.25	18.25	19.00	9.19
5	Very Dense, Brownish, fine-grained silty sand and Gravel (SM)	18.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.25	7.99	5	0.75	0.90	1.33	1.05	5	1.70	8	69.57	0.50	1.20	10	0.11	1.00	0.03	0.80	1.66	1.00	0.19	0.99	0.392	0.48	Liquefiable Soil
2	2.50	4.00	3.25	52.65	20.78	6	0.80	0.90	1.33	1.05	6	1.70	10	56.15	0.50	1.20	13	0.14	1.00	0.08	0.80	1.37	1.00	0.19	0.98	0.385	0.49	Liquefiable Soil
3	4.00	5.50	4.75	76.95	30.37	9	0.85	0.90	1.33	1.05	10	1.70	16	78.09	0.50	1.20	20	0.22	1.00	0.17	0.80	1.27	1.00	0.28	0.96	0.381	0.72	Liquefiable Soil
4	5.50	7.00	6.25	102.90	41.61	12	0.95	0.90	1.33	1.05	14	1.55	22	25.79	4.37	1.12	29	0.42	1.00	0.25	0.80	1.19	1.00	0.50	0.95	0.367	1.37	Non Liquefiable Soil
5	7.00	8.50	7.75	129.68	53.67	15	0.95	0.90	1.33	1.05	18	1.36	24	25.79	4.37	1.12	32	NL	1.00	0.30	0.80	1.13	1.00	NL	0.94	0.355	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	156.35	65.64	18	0.95	0.90	1.33	1.05	21	1.23	27	75.00	0.50	1.20	32	NL	1.00	0.36	0.80	1.09	1.00	NL	0.93	0.345	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	182.98	77.55	24	1.00	0.90	1.33	1.05	30	1.14	34	75.00	0.50	1.20	42	NL	1.00	0.49	0.75	1.06	1.00	NL	0.89	0.326	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	210.85	90.72	30	1.00	0.90	1.33	1.05	38	1.05	40	37.14	0.50	1.20	48	NL	1.00	0.61	0.69	1.03	1.00	NL	0.85	0.307	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	239.35	104.51	36	1.00	0.90	1.33	1.05	45	0.98	44	20.53	3.70	1.08	52	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.288	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	267.85	118.30	43	1.00	0.90	1.33	1.05	54	0.92	50	30.39	4.73	1.16	62	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.271	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	296.35	132.09	48	1.00	0.90	1.33	1.05	60	0.87	52	27.35	4.51	1.13	64	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.254	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	324.85	145.88	54	1.00	0.90	1.33	1.05	68	0.83	56	31.64	4.81	1.17	70	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.239	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	354.10	160.42	63	1.00	0.90	1.33	1.05	79	0.79	63	29.55	4.68	1.15	77	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.223	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	383.35	174.96	100	1.00	0.90	1.33	1.05	126	0.76	95	41.50	0.50	1.20	115	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	412.60	189.50	100	1.00	0.90	1.33	1.05	126	0.73	91	21.00	3.78	1.09	103	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	441.85	204.04	100	1.00	0.90	1.33	1.05	126	0.70	88	38.70	0.50	1.20	106	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	471.10	218.58	100	1.00	0.90	1.33	1.05	126	0.68	85	24.82	4.27	1.11	99	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	500.35	233.12	100	1.00	0.90	1.33	1.05	126	0.65	82	44.11	0.50	1.20	99	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	534.48	250.08	100	1.00	0.90	1.33	1.05	126	0.63	79	30.54	4.74	1.16	97	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	553.98	259.78	100	1.00	0.90	1.33	1.05	126	0.62	78	39.83	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-108
Chainage	11+329

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose, Brownish to Brownish Grey, fine-grained silty sand and Gravel (SM	0.00	6.25	16.50	6.69
2	Medium Dense, Brownish to Yellowish, fine-grained silty sand and Grave	6.25	12.25	17.85	8.04
3	Dense, Brownish, fine-grained silty sand and Gravel (SM)	12.25	16.00	19.00	9.19
4	Very Dense, Brownish to Yellowish, fine-grained silty sand and Gravel (SM	16.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.63	8.37	5	0.75	0.90	1.33	1.05	5	1.70	8	21.66	3.88	1.09	13	0.14	1.00	0.03	0.80	1.64	1.00	0.22	0.99	0.381	0.59	Liquefiable Soil
2	2.50	4.00	3.25	53.63	21.75	7	0.80	0.90	1.33	1.05	7	1.70	12	21.66	3.88	1.09	17	0.18	1.00	0.11	0.80	1.36	1.00	0.24	0.98	0.375	0.65	Liquefiable Soil
3	4.00	5.50	4.75	78.38	31.79	10	0.85	0.90	1.33	1.05	11	1.70	18	21.43	3.84	1.09	24	0.27	1.00	0.19	0.80	1.26	1.00	0.34	0.96	0.371	0.91	Liquefiable Soil
4	5.50	7.00	6.25	103.13	41.83	16	0.95	0.90	1.33	1.05	19	1.55	30	21.43	3.84	1.09	36	NL	1.00	0.32	0.80	1.19	1.00	NL	0.95	0.366	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	129.90	53.90	22	0.95	0.90	1.33	1.05	26	1.36	36	28.99	4.64	1.15	46	NL	1.00	0.43	0.78	1.14	1.00	NL	0.94	0.354	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	156.68	65.96	24	0.95	0.90	1.33	1.05	29	1.23	35	72.32	0.50	1.20	43	NL	1.00	0.47	0.76	1.10	1.00	NL	0.93	0.344	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	183.45	78.03	27	1.00	0.90	1.33	1.05	34	1.13	38	17.70	3.17	1.06	44	NL	1.00	0.55	0.72	1.07	1.00	NL	0.89	0.325	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	210.23	90.09	34	1.00	0.90	1.33	1.05	43	1.05	45	46.20	0.50	1.20	55	NL	1.00	0.85	0.60	1.04	1.00	NL	0.85	0.308	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	238.73	103.88	42	1.00	0.90	1.33	1.05	53	0.98	52	30.33	4.73	1.16	65	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.289	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	267.23	117.67	44	1.00	0.90	1.33	1.05	55	0.92	51	26.24	4.41	1.12	62	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.272	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	296.10	131.84	53	1.00	0.90	1.33	1.05	67	0.87	58	21.60	3.87	1.09	67	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.255	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	325.35	146.38	57	1.00	0.90	1.33	1.05	72	0.83	59	27.86	4.55	1.14	72	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.238	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	354.60	160.92	66	1.00	0.90	1.33	1.05	83	0.79	65	25.57	4.35	1.12	78	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.222	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	383.85	175.46	100	1.00	0.90	1.33	1.05	126	0.75	95	21.95	3.92	1.09	108	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.207	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	413.10	190.00	100	1.00	0.90	1.33	1.05	126	0.73	91	21.63	3.87	1.09	103	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.192	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	442.35	204.54	100	1.00	0.90	1.33	1.05	126	0.70	88	27.20	4.50	1.13	104	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.178	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	471.60	219.08	100	1.00	0.90	1.33	1.05	126	0.68	85	26.61	4.44	1.13	100	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	500.85	233.62	100	1.00	0.90	1.33	1.05	126	0.65	82	27.93	4.56	1.14	98	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	534.98	250.58	100	1.00	0.90	1.33	1.05	126	0.63	79	26.61	4.44	1.13	94	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	554.48	260.28	100	1.00	0.90	1.33	1.05	126	0.62	78	65.02	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-109
Chainage	11+400

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Greyish to Brownish, fine-grained silty sand (SM	0.00	10.00	17.00	7.19
2	Dense, Brownish, fine-grained silty sand (SM)	10.00	17.25	19.00	9.19
3	Very Dense, Brownish, fine-grained silty sand (SM)	17.25	30.50	19.50	9.69
4	Stiff to very stiff, brownish, fine-grained inorganic clay of low plasticity (	30.50	24.25	17.25	7.44
5	Medium dense to dense, brownish, fine-grained silty sand with gravel (SI	24.25	30.00	17.85	8.04

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	10	0.75	0.90	1.33	1.05	9	1.70	16	26.18	4.41	1.12	22	0.25	1.00	0.17	0.80	1.62	1.00	0.40	0.99	0.365	1.10	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	15	0.80	0.90	1.33	1.05	15	1.70	26	29.90	4.70	1.15	34	NL	1.00	0.26	0.80	1.34	1.00	NL	0.98	0.360	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	16	0.85	0.90	1.33	1.05	17	1.70	29	29.90	4.70	1.15	38	NL	1.00	0.29	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	22	0.95	0.90	1.33	1.05	26	1.49	39	30.36	4.73	1.16	50	NL	1.00	0.43	0.78	1.19	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	23	0.95	0.90	1.33	1.05	27	1.34	37	21.30	3.82	1.09	44	NL	1.00	0.45	0.77	1.14	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	157.25	66.54	28	0.95	0.90	1.33	1.05	33	1.23	41	25.50	4.34	1.12	50	NL	1.00	0.55	0.73	1.12	1.00	NL	0.93	0.343	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.25	78.83	31	1.00	0.90	1.33	1.05	39	1.13	44	30.37	4.73	1.16	56	NL	1.00	0.63	0.68	1.08	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	212.75	92.62	40	1.00	0.90	1.33	1.05	50	1.04	52	24.51	4.24	1.11	62	NL	1.00	0.85	0.60	1.03	1.00	NL	0.85	0.303	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	241.25	106.41	43	1.00	0.90	1.33	1.05	54	0.97	52	27.96	4.56	1.14	64	NL	1.00	0.85	0.60	0.98	1.00	NL	0.81	0.285	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	269.75	120.20	45	1.00	0.90	1.33	1.05	57	0.91	52	25.49	4.34	1.12	62	NL	1.00	0.85	0.60	0.93	1.00	NL	0.77	0.268	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	298.25	133.99	48	1.00	0.90	1.33	1.05	60	0.86	52	25.92	4.38	1.12	63	NL	1.00	0.85	0.60	0.89	1.00	NL	0.73	0.252	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	327.25	148.28	51	1.00	0.90	1.33	1.05	64	0.82	53	25.56	4.35	1.12	63	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.236	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	356.50	162.82	55	1.00	0.90	1.33	1.05	69	0.78	54	29.99	4.71	1.15	67	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.221	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	385.75	177.36	74	1.00	0.90	1.33	1.05	93	0.75	70	27.40	4.51	1.13	84	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.206	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	415.00	191.90	100	1.00	0.90	1.33	1.05	126	0.72	91	27.47	4.52	1.13	107	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.191	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	444.25	206.44	100	1.00	0.90	1.33	1.05	126	0.70	87	27.00	4.48	1.13	103	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	473.50	220.98	100	1.00	0.90	1.33	1.05	126	0.67	85	23.50	4.12	1.10	97	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	502.75	235.52	100	1.00	0.90	1.33	1.05	126	0.65	82	24.02	4.18	1.11	95	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	536.88	252.48	100	1.00	0.90	1.33	1.05	126	0.63	79	25.98	4.39	1.12	93	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.133	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	556.38	262.18	100	1.00	0.90	1.33	1.05	126	0.62	78	24.11	4.19	1.11	90	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.123	NL	Non Liquefiable Soil

B.13. Zone 13: CH: 11+400 km to 12+130 km (BH-111 to BH-116)

Based on the geotechnical investigation and analysis, the table below provides a summary of liquefiable soil layers, including the computed factor of safety values for liquefaction assessment.

Borehole ID	Top of Layer	Bottom of Layer	N_{SPT}	N_{60}	$(N1)_{60}$	$(N1)_{60cs}$	CRR	CSR	FS_{liq}	Liquefaction Potential
BH-112	0.00	2.50	6	6	10	16	0.27	0.37	0.74	Liquefiable Soil
BH-112	2.50	4.00	7	7	12	18	0.26	0.36	0.72	Liquefiable Soil
BH-112	4.00	5.50	10	11	18	24	0.34	0.36	0.96	Liquefiable Soil
BH-112	5.50	7.00	11	13	20	27	0.39	0.35	1.11	Liquefiable Soil
BH-112	7.00	8.50	14	17	22	27	0.39	0.35	1.14	Liquefiable Soil
BH-113	0.00	2.50	7	7	11	14	0.25	0.39	0.63	Liquefiable Soil
BH-114	0.00	2.50	5	5	8	10	0.19	0.39	0.48	Liquefiable Soil
BH-114	2.50	4.00	7	7	12	15	0.22	0.39	0.56	Liquefiable Soil
BH-114	4.00	5.50	9	10	16	20	0.28	0.38	0.72	Liquefiable Soil
BH-115	0.00	2.50	9	8	14	18	0.30	0.36	0.85	Liquefiable Soil
BH-115	2.50	4.00	12	12	21	25	0.39	0.35	1.11	Liquefiable Soil
BH-116	0.00	2.50	6	6	10	15	0.26	0.37	0.72	Liquefiable Soil
BH-116	2.50	4.00	7	7	12	18	0.25	0.36	0.71	Liquefiable Soil
BH-116	4.00	5.50	9	10	16	24	0.33	0.36	0.94	Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-111
Chainage	11+609

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Dense, Greyish, fine-grained silty sand (SM)	0.00	8.25	17.00	7.19
2	Dense, Gray brownish, fine-grained silty sand (SM)	8.25	16.00	19.00	9.19
3	Very Dense, Brownish Gray, fine-grained silty sand (SM)	16.00	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	11	0.75	0.90	1.33	1.05	10	1.70	18	31.20	4.78	1.16	25	0.30	1.00	0.19	0.80	1.62	1.00	0.48	0.99	0.365	1.32	Non Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	15	0.80	0.90	1.33	1.05	15	1.70	26	31.20	4.78	1.16	35	NL	1.00	0.26	0.80	1.34	1.00	NL	0.98	0.360	NL	Non Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	21	0.85	0.90	1.33	1.05	22	1.70	38	19.67	3.56	1.08	45	NL	1.00	0.37	0.80	1.24	1.00	NL	0.96	0.355	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	27	0.95	0.90	1.33	1.05	32	1.49	48	19.67	3.56	1.08	55	NL	1.00	0.53	0.74	1.23	1.00	NL	0.95	0.351	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	29	0.95	0.90	1.33	1.05	35	1.34	46	23.44	4.11	1.10	55	NL	1.00	0.57	0.72	1.18	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.25	68.54	32	0.95	0.90	1.33	1.05	38	1.21	46	36.83	0.50	1.20	56	NL	1.00	0.62	0.69	1.12	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.75	82.33	37	1.00	0.90	1.33	1.05	47	1.10	51	24.10	4.19	1.11	61	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.316	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	216.25	96.12	42	1.00	0.90	1.33	1.05	53	1.02	54	33.60	4.91	1.18	69	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.297	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.75	109.91	45	1.00	0.90	1.33	1.05	57	0.95	54	28.34	4.59	1.14	66	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.280	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	273.25	123.70	48	1.00	0.90	1.33	1.05	60	0.90	54	29.18	4.65	1.15	67	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.264	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	302.13	137.86	52	1.00	0.90	1.33	1.05	65	0.85	56	28.27	4.58	1.14	68	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.248	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	331.38	152.40	57	1.00	0.90	1.33	1.05	72	0.81	58	30.01	4.71	1.15	72	NL	1.00	0.85	0.60	0.84	2.00	NL	0.69	0.233	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	360.63	166.94	62	1.00	0.90	1.33	1.05	78	0.77	60	27.10	4.49	1.13	73	NL	1.00	0.85	0.60	0.81	3.00	NL	0.65	0.218	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	389.88	181.48	75	1.00	0.90	1.33	1.05	94	0.74	70	32.33	4.85	1.17	87	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.203	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	419.13	196.02	84	1.00	0.90	1.33	1.05	106	0.71	75	22.33	3.97	1.10	87	NL	1.00	0.85	0.60	0.76	5.00	NL	0.57	0.189	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	448.38	210.56	100	1.00	0.90	1.33	1.05	126	0.69	87	42.21	0.50	1.20	104	NL	1.00	0.85	0.60	0.74	6.00	NL	0.53	0.175	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	477.63	225.10	100	1.00	0.90	1.33	1.05	126	0.67	84	24.21	4.20	1.11	97	NL	1.00	0.85	0.60	0.72	7.00	NL	0.49	0.161	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	506.88	239.64	100	1.00	0.90	1.33	1.05	126	0.65	81	49.54	0.50	1.20	98	NL	1.00	0.85	0.60	0.70	8.00	NL	0.45	0.147	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	541.00	256.61	100	1.00	0.90	1.33	1.05	126	0.62	78	29.91	4.70	1.15	95	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.131	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	560.50	266.30	100	1.00	0.90	1.33	1.05	126	0.61	77	36.85	0.50	1.20	93	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.122	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-112
Chainage	11+760

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Brownish, fine-grained silty sand with Gravel (S	0.00	8.25	17.00	7.19
2	Very Stiff, Yellowish, fine-grained inorganic silt of low Plasticity with sar	8.25	14.25	17.75	7.94
3	Dense, Brownish, fine-grained silty sand (SM)	14.25	17.25	19.00	9.19
4	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand ar	17.25	20.25	18.30	8.49
5	Very Dense, Brownish, fine-grained silty sand (SM)	20.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	6	0.75	0.90	1.33	1.05	6	1.70	10	28.50	4.60	1.14	16	0.17	1.00	0.06	0.80	1.62	1.00	0.27	0.99	0.365	0.74	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	7	0.80	0.90	1.33	1.05	7	1.70	12	28.50	4.60	1.14	18	0.19	1.00	0.11	0.80	1.34	1.00	0.26	0.98	0.360	0.72	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	10	0.85	0.90	1.33	1.05	11	1.70	18	23.51	4.12	1.10	24	0.28	1.00	0.19	0.80	1.24	1.00	0.34	0.96	0.355	0.96	Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	11	0.95	0.90	1.33	1.05	13	1.49	20	27.87	4.55	1.14	27	0.33	1.00	0.23	0.80	1.17	1.00	0.39	0.95	0.351	1.11	Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	14	0.95	0.90	1.33	1.05	17	1.34	22	18.91	3.42	1.07	27	0.35	1.00	0.28	0.80	1.12	1.00	0.39	0.94	0.347	1.14	Liquefiable Soil
6	8.50	10.00	9.25	158.00	67.29	17	0.95	0.90	1.33	1.05	20	1.22	25	72.05	0.50	1.20	30	NL	1.00	0.34	0.80	1.08	1.00	NL	0.93	0.340	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.63	79.20	19	1.00	0.90	1.33	1.05	24	1.12	27	72.05	0.50	1.20	33	NL	1.00	0.40	0.80	1.05	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.25	91.12	22	1.00	0.90	1.33	1.05	28	1.05	29	64.53	0.50	1.20	35	NL	1.00	0.46	0.77	1.02	1.00	NL	0.85	0.306	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	237.88	103.03	27	1.00	0.90	1.33	1.05	34	0.99	33	73.40	0.50	1.20	41	NL	1.00	0.55	0.72	0.99	1.00	NL	0.81	0.291	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	265.75	116.20	38	1.00	0.90	1.33	1.05	48	0.93	44	34.12	4.94	1.19	58	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.274	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	294.25	129.99	50	1.00	0.90	1.33	1.05	63	0.88	55	24.40	4.22	1.11	65	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.257	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	322.05	143.08	44	1.00	0.90	1.33	1.05	55	0.84	46	78.68	0.50	1.20	56	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.241	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	349.50	155.82	51	1.00	0.90	1.33	1.05	64	0.80	51	63.74	0.50	1.20	62	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.226	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	378.15	169.76	59	1.00	0.90	1.33	1.05	74	0.77	57	35.15	0.50	1.20	69	NL	1.00	0.85	0.60	0.81	4.00	NL	0.61	0.211	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	407.40	184.30	70	1.00	0.90	1.33	1.05	88	0.74	65	20.51	3.70	1.08	74	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.195	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	436.65	198.84	100	1.00	0.90	1.33	1.05	126	0.71	89	31.41	4.79	1.17	109	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.180	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	465.90	213.38	100	1.00	0.90	1.33	1.05	126	0.68	86	32.25	4.84	1.17	106	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.166	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	495.15	227.92	100	1.00	0.90	1.33	1.05	126	0.66	83	36.48	0.50	1.20	100	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.151	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	529.28	244.88	100	1.00	0.90	1.33	1.05	126	0.64	80	27.00	4.48	1.13	95	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.135	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	548.78	254.58	100	1.00	0.90	1.33	1.05	126	0.63	79	28.48	4.60	1.14	95	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.125	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-113
Chainage	11+835

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Brownish, fine-grained inorganic silt of low Plastici	0.00	4.00	16.20	6.39
2	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with san	4.00	8.25	17.75	7.94
3	Dense, Brownish, fine-grained silty sand (SM)	8.25	27.25	19.00	9.19
4	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand (M	27.25	30.50	18.30	8.49

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{mx}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.25	7.99	7	0.75	0.90	1.33	1.05	7	1.70	11	75.68	0.50	1.20	14	0.15	1.00	0.10	0.80	1.66	1.00	0.25	0.99	0.392	0.63	Liquefiable Soil
2	2.50	4.00	3.25	52.65	20.78	13	0.80	0.90	1.33	1.05	13	1.70	22	75.68	0.50	1.20	27	0.34	1.00	0.23	0.80	1.37	1.00	0.47	0.98	0.385	1.22	Non Liquefiable Soil
3	4.00	5.50	4.75	78.11	31.53	19	0.85	0.90	1.33	1.05	20	1.70	35	67.85	0.50	1.20	42	NL	1.00	0.34	0.80	1.26	1.00	NL	0.96	0.372	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	104.74	43.45	27	0.95	0.90	1.33	1.05	32	1.52	49	67.85	0.50	1.20	59	NL	1.00	0.53	0.74	1.25	1.00	NL	0.95	0.358	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	131.36	55.36	29	0.95	0.90	1.33	1.05	35	1.34	47	71.80	0.50	1.20	56	NL	1.00	0.57	0.72	1.18	1.00	NL	0.94	0.348	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	159.24	68.53	34	0.95	0.90	1.33	1.05	41	1.21	49	30.83	4.76	1.16	62	NL	1.00	0.85	0.60	1.16	1.00	NL	0.93	0.337	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	187.74	82.32	33	1.00	0.90	1.33	1.05	41	1.10	46	24.80	4.27	1.11	55	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.316	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	216.24	96.11	37	1.00	0.90	1.33	1.05	47	1.02	47	26.00	4.39	1.12	58	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.297	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	244.74	109.90	40	1.00	0.90	1.33	1.05	50	0.95	48	24.56	4.24	1.11	58	NL	1.00	0.85	0.60	0.96	1.00	NL	0.81	0.280	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	273.24	123.69	45	1.00	0.90	1.33	1.05	57	0.90	51	44.24	0.50	1.20	62	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.264	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	301.74	137.48	48	1.00	0.90	1.33	1.05	60	0.85	51	26.04	4.39	1.12	62	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.249	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	330.24	151.27	51	1.00	0.90	1.33	1.05	64	0.81	52	36.66	0.50	1.20	63	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.234	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	358.74	165.06	51	1.00	0.90	1.33	1.05	64	0.78	50	20.38	3.68	1.08	58	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.219	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	387.24	178.85	60	1.00	0.90	1.33	1.05	75	0.75	56	43.54	0.50	1.20	68	NL	1.00	0.85	0.60	0.79	4.00	NL	0.61	0.205	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	415.74	192.64	73	1.00	0.90	1.33	1.05	92	0.72	66	20.90	3.76	1.09	76	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.191	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	444.24	206.43	75	1.00	0.90	1.33	1.05	94	0.70	66	47.11	0.50	1.20	79	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.177	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	472.74	220.22	86	1.00	0.90	1.33	1.05	108	0.67	73	22.13	3.94	1.09	84	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.163	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	501.24	234.01	100	1.00	0.90	1.33	1.05	126	0.65	82	48.80	0.50	1.20	99	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.149	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	533.26	248.87	100	1.00	0.90	1.33	1.05	126	0.63	80	71.27	0.50	1.20	96	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	551.56	257.36	100	1.00	0.90	1.33	1.05	126	0.62	78	53.64	0.50	1.20	95	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.125	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-114
Chainage	11+943

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Medium Stiff to Stiff, Brownish, fine-grained inorganic silt of low Plastici	0.00	5.25	16.20	6.39
2	Medium Dense, Brownish Gray, fine-grained silty sand (SM)	5.25	8.25	17.00	7.19
3	Very Stiff, Yellowish, fine-grained inorganic silt of low Plasticity with sar	8.25	11.25	17.75	7.94
4	Dense, Yellowish, fine-grained silty sand and Gravel(SM)	11.25	16.00	19.00	9.19
5	Very Dense, Brownish, fine-grained silty sand and Gravel (SM)	16.00	26.25	19.50	9.69
6	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand (M	26.25	30.50	18.30	8.49

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	20.25	7.99	5	0.75	0.90	1.33	1.05	5	1.70	8	68.86	0.50	1.20	10	0.11	1.00	0.03	0.80	1.66	1.00	0.19	0.99	0.392	0.48	Liquefiable Soil
2	2.50	4.00	3.25	52.65	20.78	7	0.80	0.90	1.33	1.05	7	1.70	12	64.18	0.50	1.20	15	0.16	1.00	0.11	0.80	1.37	1.00	0.22	0.98	0.385	0.56	Liquefiable Soil
3	4.00	5.50	4.75	76.95	30.37	9	0.85	0.90	1.33	1.05	10	1.70	16	71.44	0.50	1.20	20	0.22	1.00	0.17	0.80	1.27	1.00	0.28	0.96	0.381	0.72	Liquefiable Soil
4	5.50	7.00	6.25	102.05	40.76	12	0.95	0.90	1.33	1.05	14	1.57	22	24.36	4.22	1.11	29	0.42	1.00	0.25	0.80	1.20	1.00	0.50	0.95	0.372	1.34	Non Liquefiable Soil
5	7.00	8.50	7.75	127.55	51.55	18	0.95	0.90	1.33	1.05	21	1.39	30	24.36	4.22	1.11	37	NL	1.00	0.36	0.80	1.14	1.00	NL	0.94	0.363	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	153.80	63.09	20	0.95	0.90	1.33	1.05	24	1.26	30	93.04	0.50	1.20	37	NL	1.00	0.40	0.80	1.10	1.00	NL	0.93	0.353	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	180.43	75.00	26	1.00	0.90	1.33	1.05	33	1.15	38	66.03	0.50	1.20	46	NL	1.00	0.53	0.73	1.08	1.00	NL	0.89	0.333	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	208.30	88.17	32	1.00	0.90	1.33	1.05	40	1.06	43	22.40	3.98	1.10	51	NL	1.00	0.85	0.60	1.05	1.00	NL	0.85	0.312	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	236.80	101.96	35	1.00	0.90	1.33	1.05	44	0.99	44	22.40	3.98	1.10	52	NL	1.00	0.85	0.60	0.99	1.00	NL	0.81	0.292	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	265.30	115.75	44	1.00	0.90	1.33	1.05	55	0.93	51	25.43	4.33	1.12	62	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.274	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	294.18	129.91	52	1.00	0.90	1.33	1.05	65	0.88	57	27.97	4.56	1.14	70	NL	1.00	0.85	0.60	0.90	1.00	NL	0.73	0.257	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	323.43	144.45	55	1.00	0.90	1.33	1.05	69	0.83	58	23.42	4.11	1.10	68	NL	1.00	0.85	0.60	0.86	2.00	NL	0.69	0.240	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	352.68	158.99	66	1.00	0.90	1.33	1.05	83	0.79	66	24.24	4.21	1.11	77	NL	1.00	0.85	0.60	0.83	3.00	NL	0.65	0.224	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	381.93	173.53	76	1.00	0.90	1.33	1.05	96	0.76	73	29.28	4.66	1.15	88	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.208	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	411.18	188.07	81	1.00	0.90	1.33	1.05	102	0.73	74	24.17	4.20	1.11	87	NL	1.00	0.85	0.60	0.78	5.00	NL	0.57	0.193	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	440.43	202.61	100	1.00	0.90	1.33	1.05	126	0.70	88	37.74	0.50	1.20	106	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	469.68	217.15	100	1.00	0.90	1.33	1.05	126	0.68	85	32.23	4.84	1.17	105	NL	1.00	0.85	0.60	0.73	7.00	NL	0.49	0.164	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	498.93	231.69	100	1.00	0.90	1.33	1.05	126	0.66	83	65.96	0.50	1.20	100	NL	1.00	0.85	0.60	0.71	8.00	NL	0.45	0.150	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	533.05	248.66	100	1.00	0.90	1.33	1.05	126	0.63	80	74.32	0.50	1.20	96	NL	1.00	0.85	0.60	0.69	9.00	NL	0.40	0.134	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	552.55	258.35	100	1.00	0.90	1.33	1.05	126	0.62	78	64.50	0.50	1.20	94	NL	1.00	0.85	0.60	0.68	10.00	NL	0.37	0.124	NL	Non Liquefiable Soil

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-115
Chainage	12+051

Density Profile

Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Stiff to Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity w	0.00	5.25	17.25	7.44
2	Medium Dense to Dense, Greyish to Brownish, fine-grained silty sand and	5.25	11.25	17.85	8.04
3	Hard, Brownish, fine-grained inorganic silt of low Plasticity with sand(M	11.25	14.25	18.30	8.49
4	Dense, Brownish to Yellowish, fine-grained silty sand and Gravel(SM)	14.25	20.25	19.00	9.19
5	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand(M	20.25	23.25	18.30	8.49
6	Very Dense, Brownish to Yellowish, fine-grained silty sand (SM)	23.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-				-	-	-	-
1	0.00	2.50	1.25	21.56	9.30	9	0.75	0.90	1.33	1.05	8	1.70	14	79.81	0.50	1.20	18	0.19	1.00	0.16	0.80	1.61	1.00	0.30	0.99	0.358	0.85	Liquefiable Soil
2	2.50	4.00	3.25	56.06	24.19	12	0.80	0.90	1.33	1.05	12	1.70	21	72.17	0.50	1.20	25	0.29	1.00	0.21	0.80	1.33	1.00	0.39	0.98	0.353	1.11	Liquefiable Soil
3	4.00	5.50	4.75	81.94	35.36	17	0.85	0.90	1.33	1.05	18	1.68	31	72.17	0.50	1.20	37	NL	1.00	0.31	0.80	1.23	1.00	NL	0.96	0.348	NL	Non Liquefiable Soil
4	5.50	7.00	6.25	108.41	47.12	25	0.95	0.90	1.33	1.05	30	1.46	43	29.93	4.70	1.15	55	NL	1.00	0.49	0.76	1.20	1.00	NL	0.95	0.342	NL	Non Liquefiable Soil
5	7.00	8.50	7.75	135.19	59.19	27	0.95	0.90	1.33	1.05	32	1.30	42	29.93	4.70	1.15	53	NL	1.00	0.53	0.74	1.15	1.00	NL	0.94	0.335	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	161.96	71.25	33	0.95	0.90	1.33	1.05	39	1.18	47	26.39	4.42	1.13	57	NL	1.00	0.64	0.68	1.11	1.00	NL	0.93	0.330	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	188.74	83.32	35	1.00	0.90	1.33	1.05	44	1.10	48	19.17	3.47	1.07	55	NL	1.00	0.85	0.60	1.08	1.00	NL	0.89	0.313	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	215.96	95.83	34	1.00	0.90	1.33	1.05	43	1.02	44	52.32	0.50	1.20	53	NL	1.00	0.85	0.60	1.02	1.00	NL	0.85	0.298	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	243.41	108.57	39	1.00	0.90	1.33	1.05	49	0.96	47	75.26	0.50	1.20	57	NL	1.00	0.85	0.60	0.97	1.00	NL	0.81	0.282	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	271.56	122.01	41	1.00	0.90	1.33	1.05	52	0.91	47	36.20	0.50	1.20	56	NL	1.00	0.85	0.60	0.92	1.00	NL	0.77	0.266	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	300.06	135.80	45	1.00	0.90	1.33	1.05	57	0.86	49	26.96	4.48	1.13	59	NL	1.00	0.85	0.60	0.88	1.00	NL	0.73	0.251	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	328.56	149.59	47	1.00	0.90	1.33	1.05	59	0.82	48	46.04	0.50	1.20	58	NL	1.00	0.85	0.60	0.85	2.00	NL	0.69	0.235	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	357.06	163.38	51	1.00	0.90	1.33	1.05	64	0.78	50	20.32	3.67	1.08	58	NL	1.00	0.85	0.60	0.82	3.00	NL	0.65	0.220	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	384.86	176.47	55	1.00	0.90	1.33	1.05	69	0.75	52	61.40	0.50	1.20	63	NL	1.00	0.85	0.60	0.80	4.00	NL	0.61	0.206	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	412.31	189.21	59	1.00	0.90	1.33	1.05	74	0.73	54	71.18	0.50	1.20	65	NL	1.00	0.85	0.60	0.77	5.00	NL	0.57	0.193	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	439.76	201.95	68	1.00	0.90	1.33	1.05	85	0.70	60	43.82	0.50	1.20	73	NL	1.00	0.85	0.60	0.75	6.00	NL	0.53	0.179	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	467.21	214.69	77	1.00	0.90	1.33	1.05	97	0.68	66	24.78	4.27	1.11	78	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.165	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	494.66	227.43	100	1.00	0.90	1.33	1.05	126	0.66	83	41.24	0.50	1.20	101	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.151	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	526.69	242.29	100	1.00	0.90	1.33	1.05	126	0.64	81	25.67	4.36	1.12	95	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.136	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	544.99	250.79	100	1.00	0.90	1.33	1.05	126	0.63	79	32.45	4.85	1.17	98	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.126	NL	Non Liquefiable Soil

GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

Liquefaction Susceptibility Assessment (Based on SPT N Value)

Analysis in accordance with IS 1893 (Part 1):2016 ANNEX F (Clause 3.12 & 6.3.5.3)

Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH
Stretch:	Noida Sector-142 to Botanical Garden (0-380km to 12+130 km)

Site Details	
Borehole No.	BH-116
Chainage	12+130

Density Profile						
Sr No.	Layer Discription	from	to	Bulk (kn/m³)	Submerged (kn/m³)
1	Loose to Medium Dense, Yellowish to Brownish, fine-grained silty sand(S	0.00	8.25	17.00	7.19
2	Very Stiff, Brownish, fine-grained inorganic silt of low Plasticity with san	8.25	11.25	17.75	7.94
3	Medium Dense to Dense, Yellowish to Brownish, fine-grained silty sand a	11.25	17.25	17.85	8.04
4	Hard, Yellowish, fine-grained inorganic silt of low Plasticity with sand ar	17.25	20.25	18.30	8.49
5	Very Dense, Yellowish to Brownish, fine-grained silty sand and Gravel(SM	20.25	30.50	19.50	9.69

Earthquake Factor	
Seismic Zone	IV
Earthquake Magnitude	7.5
PGA (g) or (a_{max}/g)	0.24
Factor of Safety (FS)	1.2

NL:Not Liquefiable (if $(N_1)_{60CS} > 30$)

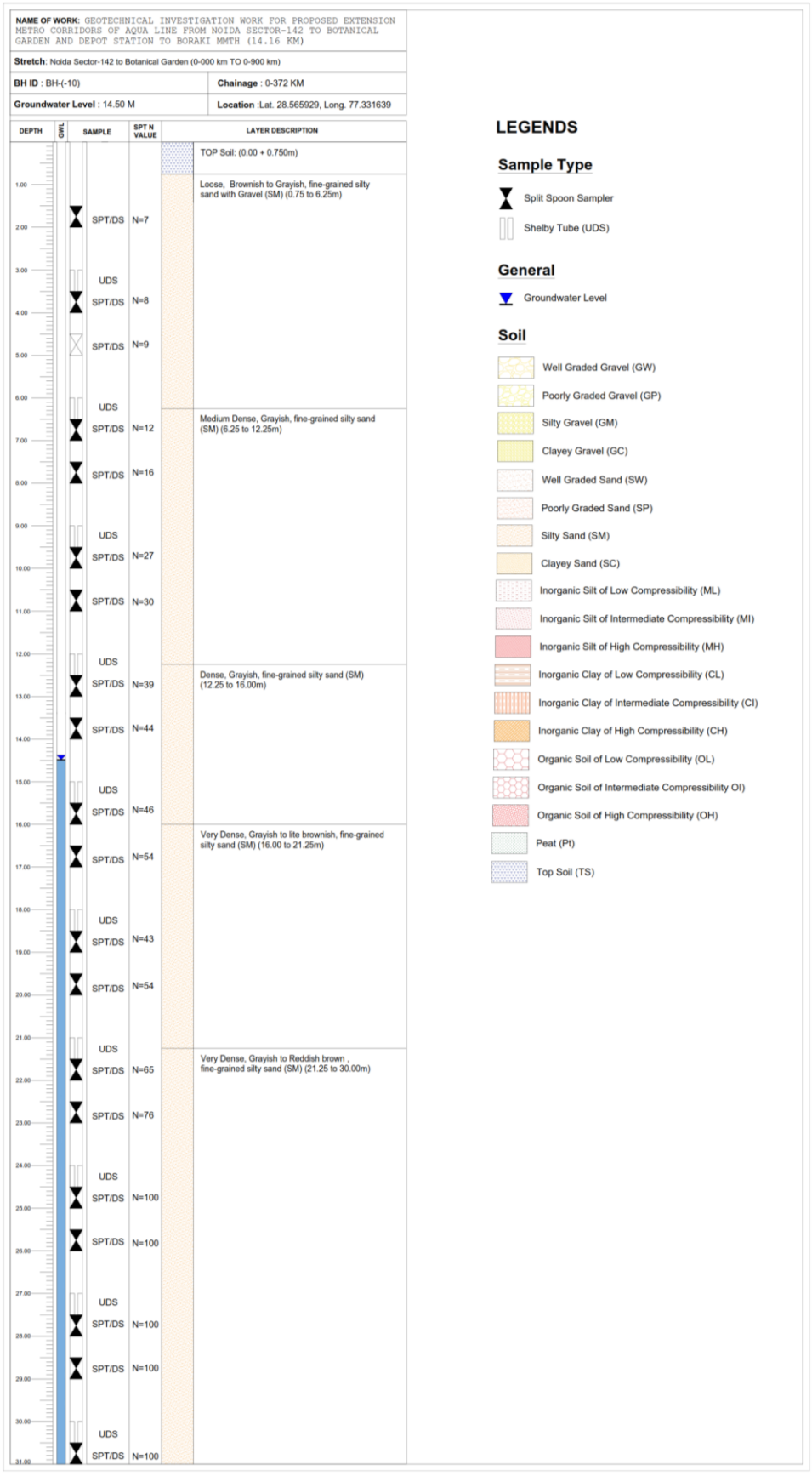
Groundwater Details	
Existing Ground Level, EGL(m)	-
GW Depth (m)	0
Design GW Depth (m)	0
Design GW Level (m)	0

Boring Datils		
	Sampler with Liner	No
Hammer Used	Dount hammer with trip/auto	Trip
	Hammer Type Correction (C_{HT})	1.33
	Borehole Diameter (mm)	150
	Borehole Diameter Correction (C_{BD})	1.05
	Hammer weight or hight of fall (C_{HW})	1.00
	Sampler Correction (C_{SS})	0.90

Layer	Top of Layer	Bottom of Layer	Depth to middle of layer	Total Overburden Pressure at Middle of Layer	Effective Stress at Middle of Layer	NSPT	Correction for rod Length (CRL)	Sampler Correction (CSS)	Hammer Type Correction (CHT)	Borehole Diameter Correction (CBD)	N60	Overburden Correction Factor (CN)	$(N_1)_{60}$	Fines Content	α	β	$(N_1)_{60CS}$	CRR 7.5	Magnitude Scaling Factor (MSF)	Relative Density (D_r)	Factor (f)	Overburden Correction Factor (k_σ)	Sloping Ground Correction Factor (k_α)	CRR	Stress Reduction Factor (rd)	CSR	Computed SF against Liquefaction	Liquefaction
No.	(m)	(m)	(m)	(kn/m²)	(kn/m²)	-	-	-	-	-	-	-	-	%	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.00	2.50	1.25	21.25	8.99	6	0.75	0.90	1.33	1.05	6	1.70	10	26.44	4.43	1.13	15	0.16	1.00	0.06	0.80	1.62	1.00	0.26	0.99	0.365	0.72	Liquefiable Soil
2	2.50	4.00	3.25	55.25	23.38	7	0.80	0.90	1.33	1.05	7	1.70	12	26.44	4.43	1.13	18	0.19	1.00	0.11	0.80	1.34	1.00	0.25	0.98	0.360	0.71	Liquefiable Soil
3	4.00	5.50	4.75	80.75	34.17	9	0.85	0.90	1.33	1.05	10	1.70	16	31.25	4.78	1.16	24	0.27	1.00	0.17	0.80	1.24	1.00	0.33	0.96	0.355	0.94	Liquefiable Soil
4	5.50	7.00	6.25	106.25	44.96	12	0.95	0.90	1.33	1.05	14	1.49	21	31.25	4.78	1.16	30	0.45	1.00	0.25	0.80	1.17	1.00	0.52	0.95	0.351	1.49	Non Liquefiable Soil
5	7.00	8.50	7.75	131.75	55.75	16	0.95	0.90	1.33	1.05	19	1.34	26	20.93	3.77	1.09	32	NL	1.00	0.32	0.80	1.12	1.00	NL	0.94	0.347	NL	Non Liquefiable Soil
6	8.50	10.00	9.25	158.00	67.29	18	0.95	0.90	1.33	1.05	21	1.22	26	87.78	0.50	1.20	32	NL	1.00	0.36	0.80	1.08	1.00	NL	0.93	0.340	NL	Non Liquefiable Soil
7	10.00	11.50	10.75	184.63	79.20	22	1.00	0.90	1.33	1.05	28	1.12	31	73.69	0.50	1.20	38	NL	1.00	0.46	0.77	1.05	1.00	NL	0.89	0.323	NL	Non Liquefiable Soil
8	11.50	13.00	12.25	211.35	91.22	26	1.00	0.90	1.33	1.05	33	1.05	34	44.90	0.50	1.20	42	NL	1.00	0.53	0.73	1.02	1.00	NL	0.85	0.306	NL	Non Liquefiable Soil
9	13.00	14.50	13.75	238.13	103.28	30	1.00	0.90	1.33	1.05	38	0.98	37	28.95	4.63	1.15	47	NL	1.00	0.61	0.69	0.99	1.00	NL	0.81	0.290	NL	Non Liquefiable Soil
10	14.50	16.00	15.25	264.90	115.35	34	1.00	0.90	1.33	1.05	43	0.93	40	32.22	4.84	1.17	52	NL	1.00	0.85	0.60	0.94	1.00	NL	0.77	0.275	NL	Non Liquefiable Soil
11	16.00	17.50	16.75	291.68	127.41	44	1.00	0.90	1.33	1.05	55	0.89	49	31.15	4.78	1.16	62	NL	1.00	0.85	0.60	0.91	1.00	NL	0.73	0.260	NL	Non Liquefiable Soil
12	17.50	19.00	18.25	318.90	139.93	34	1.00	0.90	1.33	1.05	43	0.85	36	33.07	4.89	1.18	48	NL	1.00	0.85	0.60	0.87	2.00	NL	0.69	0.244	NL	Non Liquefiable Soil
13	19.00	20.50	19.75	346.35	152.67	40	1.00	0.90	1.33	1.05	50	0.81	41	68.34	0.50	1.20	49	NL	1.00	0.85	0.60	0.84	3.00	NL	0.65	0.229	NL	Non Liquefiable Soil
14	20.50	22.00	21.25	375.00	166.61	66	1.00	0.90	1.33	1.05	83	0.77	64	41.84	0.50	1.20	78	NL	1.00	0.85	0.60	0.82	4.00	NL	0.61	0.213	NL	Non Liquefiable Soil
15	22.00	23.50	22.75	404.25	181.15	72	1.00	0.90	1.33	1.05	90	0.74	67	27.34	4.51	1.13	81	NL	1.00	0.85	0.60	0.79	5.00	NL	0.57	0.197	NL	Non Liquefiable Soil
16	23.50	25.00	24.25	433.50	195.69	100	1.00	0.90	1.33	1.05	126	0.71	90	34.88	4.97	1.20	112	NL	1.00	0.85	0.60	0.76	6.00	NL	0.53	0.182	NL	Non Liquefiable Soil
17	25.00	26.50	25.75	462.75	210.23	100	1.00	0.90	1.33	1.05	126	0.69	87	28.24	4.58	1.14	103	NL	1.00	0.85	0.60	0.74	7.00	NL	0.49	0.167	NL	Non Liquefiable Soil
18	26.50	28.00	27.25	492.00	224.77	100	1.00	0.90	1.33	1.05	126	0.67	84	40.84	0.50	1.20	101	NL	1.00	0.85	0.60	0.72	8.00	NL	0.45	0.152	NL	Non Liquefiable Soil
19	28.50	29.50	29.00	526.13	241.73	100	1.00	0.90	1.33	1.05	126	0.64	81	28.48	4.60	1.14	97	NL	1.00	0.85	0.60	0.70	9.00	NL	0.40	0.136	NL	Non Liquefiable Soil
20	29.50	30.50	30.00	545.63	251.43	100	1.00	0.90	1.33	1.05	126	0.63	79	42.88	0.50	1.20	96	NL	1.00	0.85	0.60	0.69	10.00	NL	0.37	0.126	NL	Non Liquefiable Soil

Appendix C Borelog & Test Results

C.1. Zone 1: CH: 0-372 km to 0+500 km (BH-(-02) to BH-(-09)

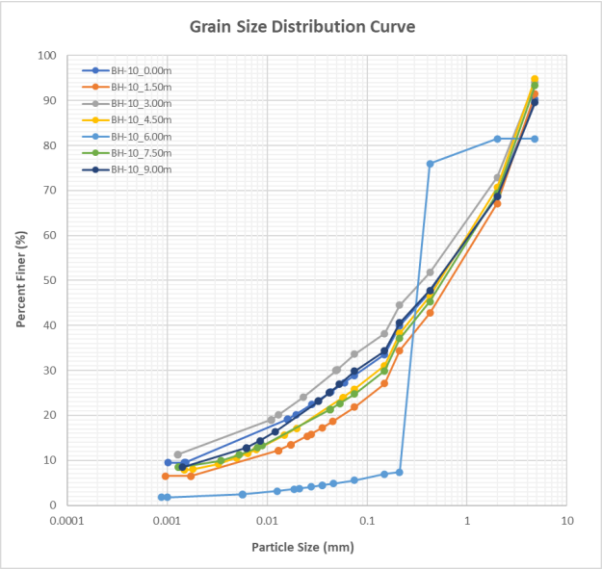


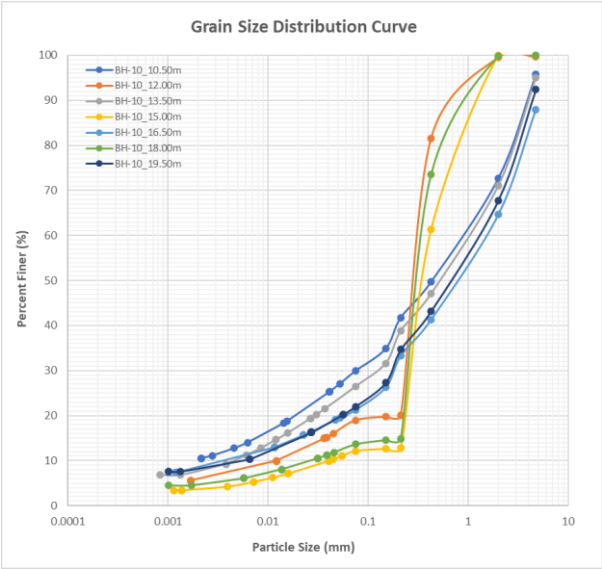
GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

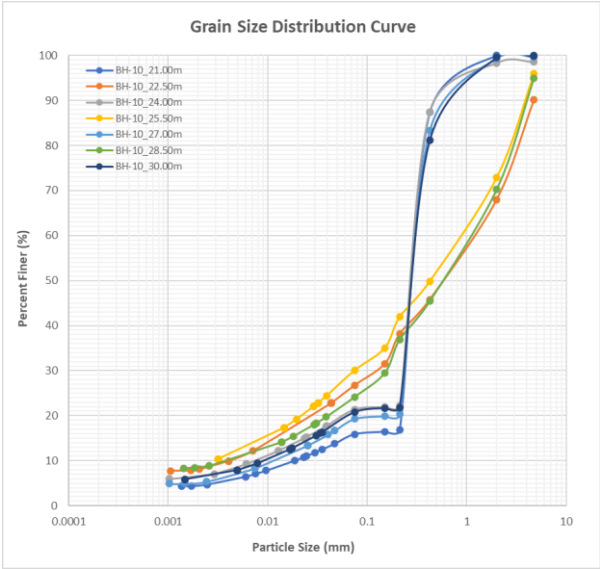
Project		Borehole Details		Drilling Details	
Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km) (E Tender No. NMRC/Civil/Geo. Inv./366/2025)	**BH ID:**	BH-(-10)	**Contractor:**	Goma Engineering & Consultancy
		Chainage [km]:	0-372	**Method of Drilling:**	Rotary Drilling
Client:	Noida Metro Rail Corporation (NMRC) Limited	**Depth [m]:**	30.00	**Start Date:**	10-03-2026
Stretch:	Noida Sector-142 to Botanical Garden	**Elevation [m]:**	199.7	**End Date:**	10-03-2026
Project Code:	158_R01_Noida Sector-142 to Botanical Garden_0-372 km TO 12+130 km	**Water table Level [m]:**	14.50	**Location:**	Lat. 28.565929, Long. 77.331639

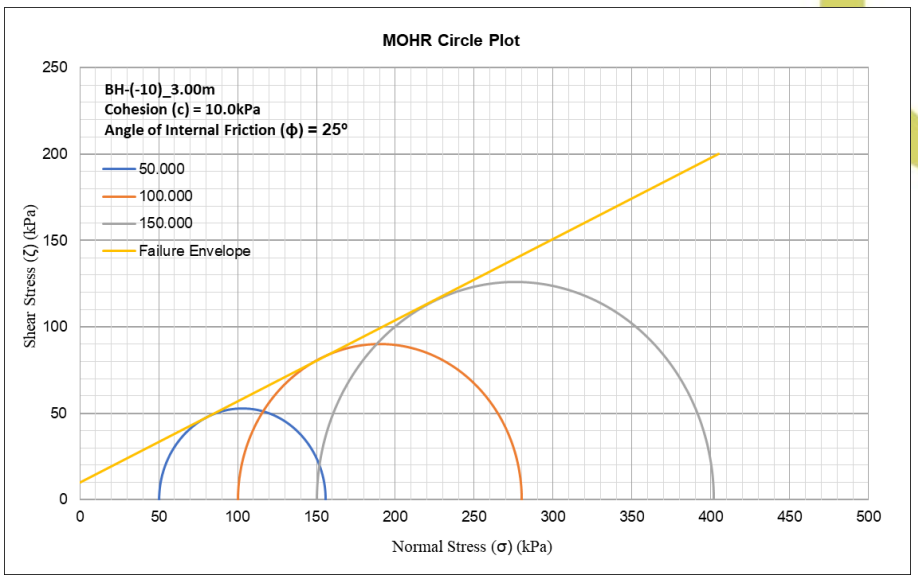
Depth [m]	Sample Type	Descriptions	SPT Test Results					Soil Particles				Atterberg Limits			Physical Characteristics				Direct Shear Test			Triaxial Comp Test			Consolidation Test		
			N1 (Seating Drive)	N2 (First Drive)	N3 (Second Drive)	Observed SPT	N (Correct N)	Gravel [%]	Sand [%]	Silt [%]	Clay [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	Moisture Content [%]	Bulk Density [gm/cm^3]	Dry Density [gm/cm^3]	Specific Gravity	Type	Cohesion [kg/cm^2]	Angle of Friction [°]	Type	Cohesion [kPa]	Angle of Friction [°]	Swelling Index	Consolidation Index	Preconsolidation Pressure [kg/cm^2]
0.00	DS	Top Soil						9.6	61.5	18.3	10.6	24	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
1.50	SPT/DS	Loose, Brownish to Grayish, fine-grained silty sand with Gravel (SM)	2	3	4	7	10	8.6	69.5	14.9	6.9	23	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
3.00	UDS							5.9	60.5	20.7	12.9	29	NP	NP	19.87	1.84	1.53	2.68	F	0.01	21	UU	10	25	-	-	-
3.50	SPT/DS		2	3	5	8	9	-																			
4.50	SPT/DS		3	4	5	9	9	5.2	69.0	17.6	8.2	27	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
6.00	DS							18.6	75.9	5.6	0.0	26	NP	NP	22.00	-	-	2.69	F	0.02	23	-	-	-	-	-	-
6.50	SPT/DS	Medium Dense, Grayish, fine-grained silty sand (SM)	4	5	7	12	11	-																			
7.50	SPT/DS		5	7	9	16	15	6.7	68.6	15.7	9.1	22	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
9.00	UDS							10.5	59.7	20.4	9.5	24	NP	NP	15.39	1.87	1.62	2.68	F	0.03	25	UU	6	27	-	-	-
9.50	SPT/DS		9	12	15	27	23	-																			
10.50	SPT/DS		10	13	17	30	25	4.3	65.8	19.4	10.5	29	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
12.00	DS							0.3	80.7	13.0	6.0	25	NP	NP	19.00	-	-	2.65	F	0.02	27	-	-	-	-	-	-
12.50	SPT/DS	Dense, Grayish, fine-grained silty sand (SM)	13	18	21	39	29	-																			
13.50	SPT/DS		15	20	24	44	32	4.9	68.6	18.7	7.7	21	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
15.00	DS							0.0	87.9	8.4	3.7	28	NP	NP	13.37	-	-	2.73	F	0.04	28	-	-	-	-	-	-
15.50	SPT/DS		18	21	25	46	23	-																			
16.50	SPT/DS	Very Dense, Grayish to lite brownish, fine-grained silty sand (SM)	20	24	30	54	25	12.0	66.7	12.7	8.6	26	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
18.00	DS							0.0	86.4	8.9	4.7	24	NP	NP	11.31	-	-	2.69	F	0.04	30	-	-	-	-	-	-
18.50	SPT/DS		17	20	23	43	21	-																			
19.50	SPT/DS		20	24	30	54	24	7.6	70.3	13.7	8.3	23	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
21.00	DS							0.0	84.1	11.4	4.5	25	NP	NP	14.29	-	-	2.63	F	0.00	30	-	-	-	-	-	-
21.50	SPT/DS	Very Dense, Grayish to Reddish brown, fine-grained silty sand (SM)	24	30	35	65	27	-																			
22.50	SPT/DS		30	36	40	76	30	9.8	63.4	18.7	8.0	24	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
24.00	DS							1.5	77.1	14.8	6.6	28	NP	NP	20.99	-	-	2.77	F	0.02	31	-	-	-	-	-	-
24.50	SPT/DS		42	(50/13 cm)		100	37	-																			
25.50	SPT/DS		46	(50/11 cm)		100	36	4.1	65.9	21.2	8.9	24	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
27.00	DS							0.4	80.3	14.2	5.2	23	NP	NP	16.59	-	-	2.65	F	0.03	32	-	-	-	-	-	-
27.50	SPT/DS		48	(50/9 cm)		100	35	-																			
28.50	SPT/DS		(50/13 cm)			100	35	5.0	70.8	15.7	8.5	25	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
30.00	DS							0.1	79.1	14.4	6.4	26	NP	NP	19.51	-	-	2.63	F	0.00	33	-	-	-	-	-	-
30.50	SPT/DS		(50/12 cm)			100	34	-																			

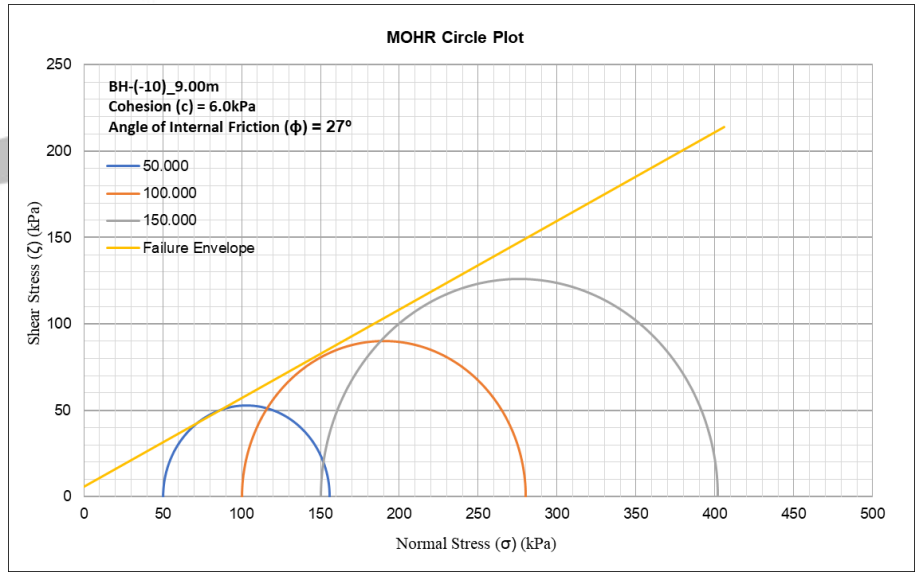
Notations: UDS = Undisturbed Sample, DS = Disturbed Sample, RC = Rock Core, F = Fast, S = Slow, UU = Unconsolidated Undrained Tri-axial compression Test, NP = Non Plastic.

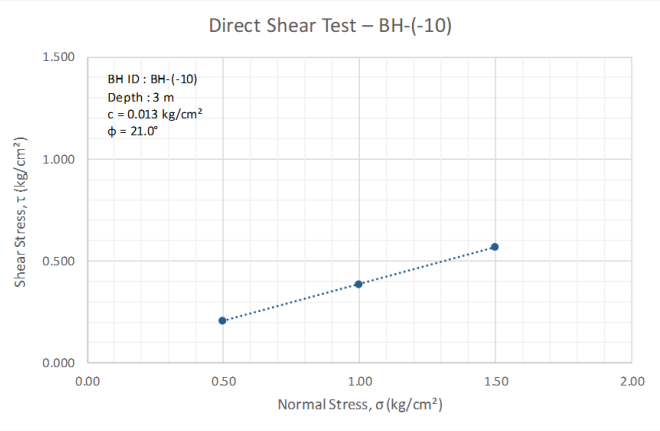

Grain Size Distribution Curve
BH-10_0.00m
BH-10_1.50m
BH-10_3.00m
BH-10_4.50m
BH-10_6.00m
BH-10_7.50m
BH-10_9.00m
Percent Finer (%)
Particle Size (mm)

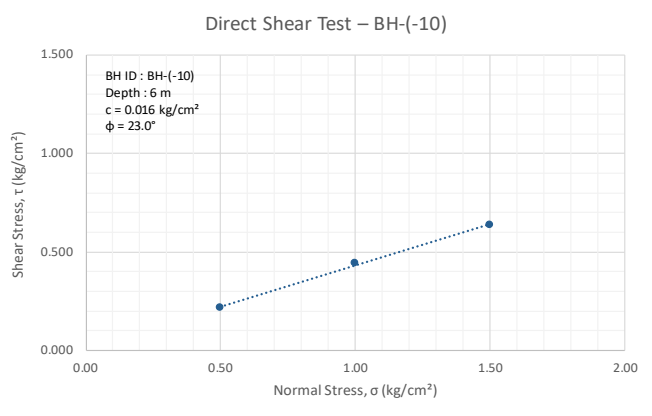

Grain Size Distribution Curve
BH-10_10.50m
BH-10_12.00m
BH-10_13.50m
BH-10_15.00m
BH-10_16.50m
BH-10_18.00m
BH-10_19.50m
Percent Finer (%)
Particle Size (mm)

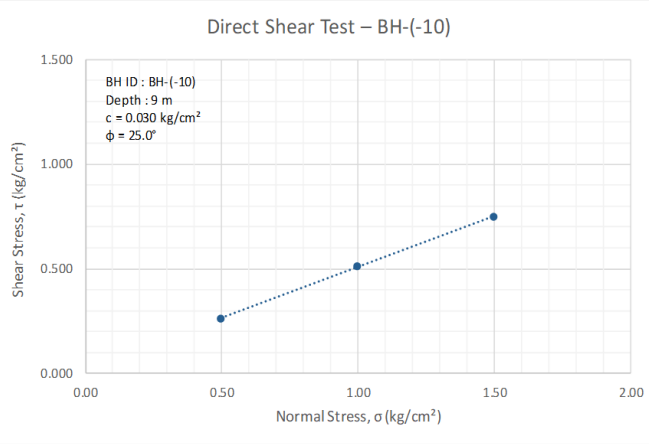

Grain Size Distribution Curve
BH-10_21.00m
BH-10_22.50m
BH-10_24.00m
BH-10_25.50m
BH-10_27.00m
BH-10_28.50m
BH-10_30.00m
Percent Finer (%)
Particle Size (mm)

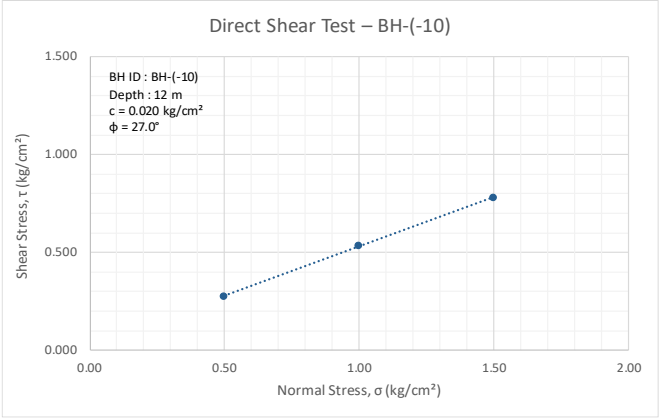

MOHR Circle Plot
BH-(-10)_3.00m
Cohesion (c) = 10.0kPa
Angle of Internal Friction (ϕ) = 25°
50.000
100.000
150.000
Failure Envelope
Shear Stress (ζ) (kPa)
Normal Stress (σ) (kPa)

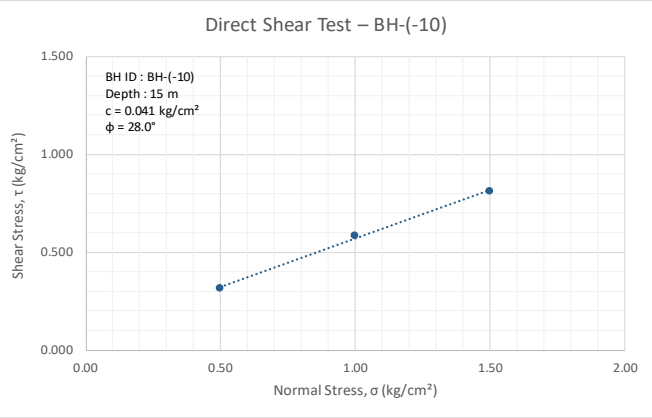

MOHR Circle Plot
BH-(-10)_9.00m
Cohesion (c) = 6.0kPa
Angle of Internal Friction (ϕ) = 27°
50.000
100.000
150.000
Failure Envelope
Shear Stress (ζ) (kPa)
Normal Stress (σ) (kPa)

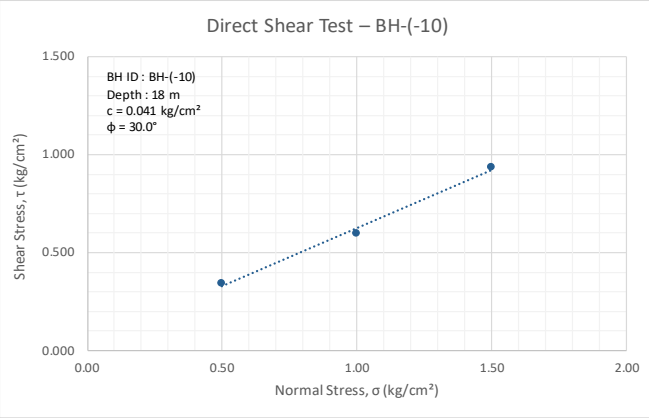

Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 3 m
c = 0.013 kg/cm²
ϕ = 21.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00

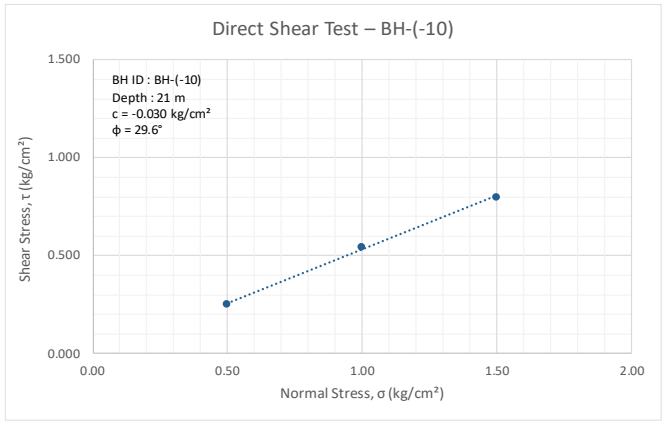

Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 6 m
c = 0.016 kg/cm²
ϕ = 23.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00

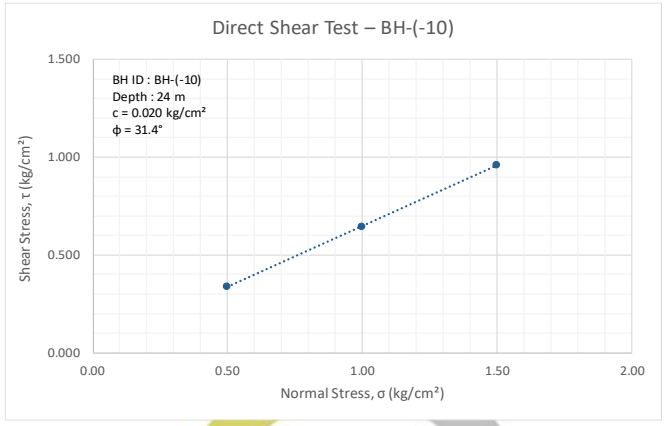

Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 9 m
c = 0.030 kg/cm²
ϕ = 25.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00

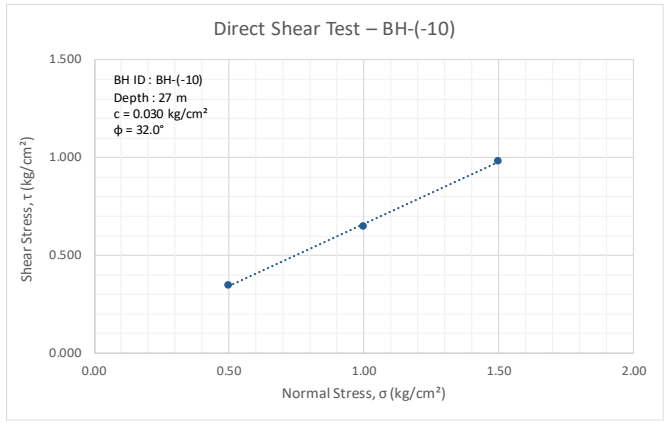

Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 12 m
c = 0.020 kg/cm²
ϕ = 27.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00

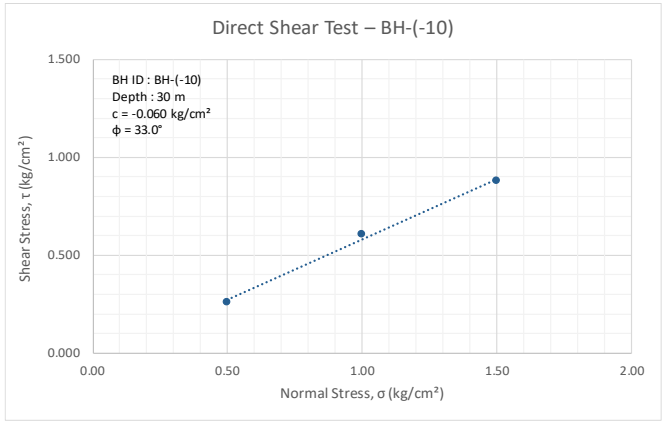

Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 15 m
c = 0.041 kg/cm²
ϕ = 28.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00


Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 18 m
c = 0.041 kg/cm²
ϕ = 30.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00


Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 21 m
c = -0.030 kg/cm²
ϕ = 29.6°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00


Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 24 m
c = 0.020 kg/cm²
ϕ = 31.4°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00


Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 27 m
c = 0.030 kg/cm²
ϕ = 32.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00

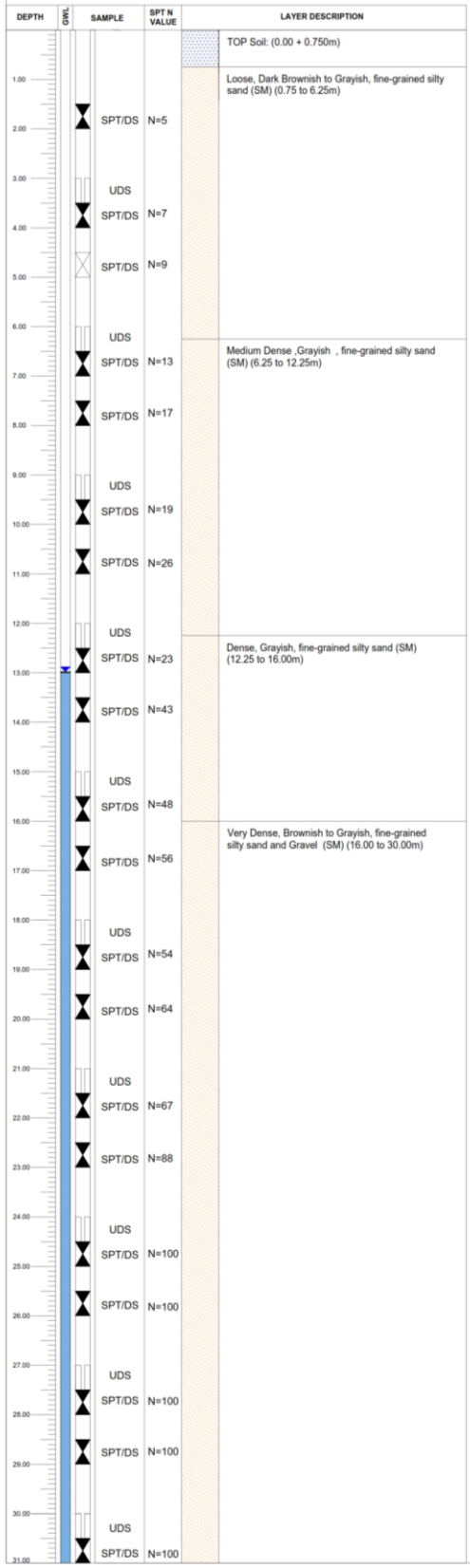

Direct Shear Test – BH-(-10)
BH ID : BH-(-10)
Depth : 30 m
c = -0.060 kg/cm²
ϕ = 33.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00

NAME OF WORK: GEOTECHNICAL INVESTIGATION WORK FOR PROPOSED EXTENSION METRO CORRIDORS OF AQUA LINE FROM NOIDA SECTOR-142 TO BOTANICAL GARDEN AND DEPOT STATION TO BORAKI MMTH (14.16 KM)

Stretch: Noida Sector-142 to Botanical Garden (0-000 km TO 0-900 km)

BH ID : BH-(-9) | **Chainage** : 0-224 KM

Groundwater Level : 13.00 M | **Location** :Lat. 28.56542, Long. 77.333116



LEGENDS

Sample Type

- Split Spoon Sampler
- Shelby Tube (UDS)

General

- Groundwater Level

Soil

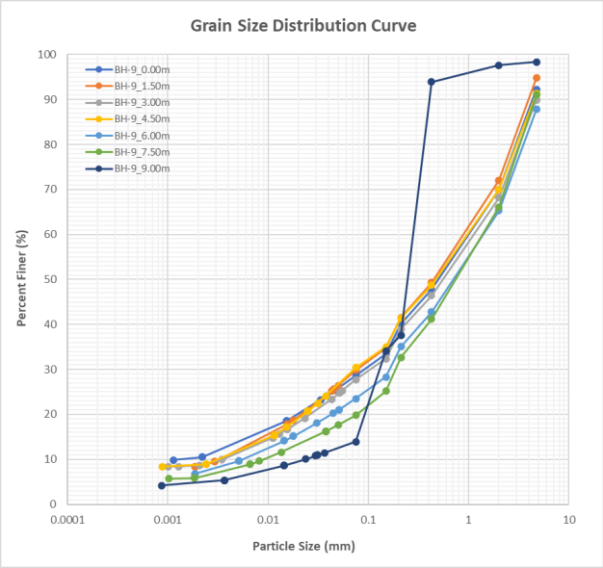
- Well Graded Gravel (GW)
- Poorly Graded Gravel (GP)
- Silty Gravel (GM)
- Clayey Gravel (GC)
- Well Graded Sand (SW)
- Poorly Graded Sand (SP)
- Silty Sand (SM)
- Clayey Sand (SC)
- Inorganic Silt of Low Compressibility (ML)
- Inorganic Silt of Intermediate Compressibility (MI)
- Inorganic Silt of High Compressibility (MH)
- Inorganic Clay of Low Compressibility (CL)
- Inorganic Clay of Intermediate Compressibility (CI)
- Inorganic Clay of High Compressibility (CH)
- Organic Soil of Low Compressibility (OL)
- Organic Soil of Intermediate Compressibility OI)
- Organic Soil of High Compressibility (OH)
- Peat (Pt)
- Top Soil (TS)

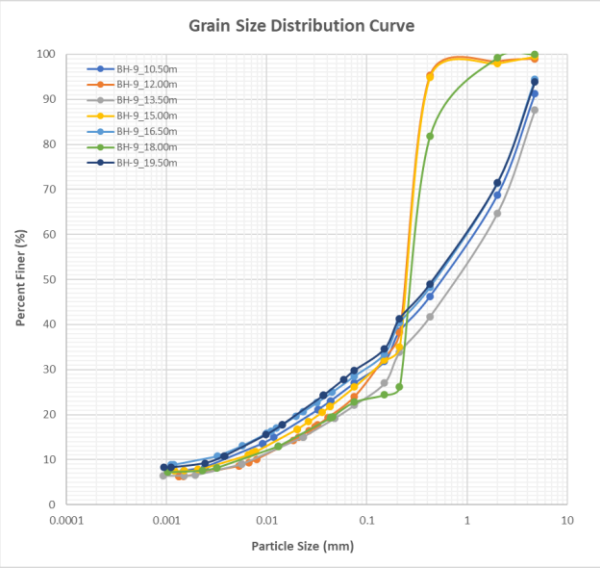
GOMA ENGINEERING AND CONSULTANCY
Quality we put forward

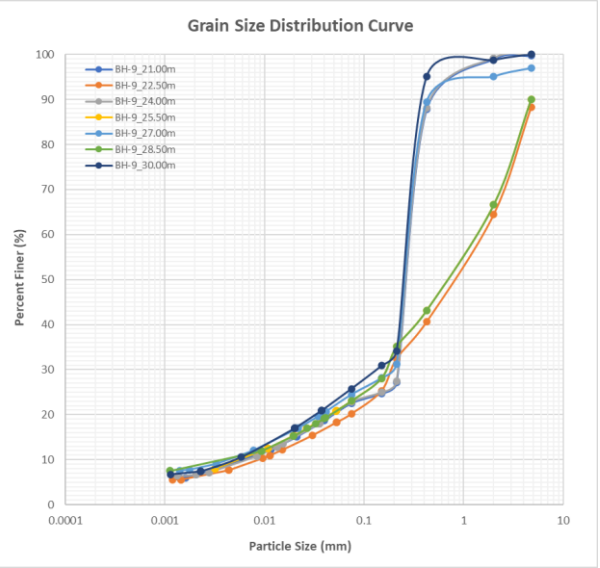
Project		Borehole Details		Drilling Details	
Name of Work:	Geotechnical Investigation work for Proposed Extension Metro Corridors of Aqua Line from Noida Sector-142 to Botanical Garden and Depot Station to Boraki MMTH (14.16 km) (E Tender No. NMRC/Civil/Geo. Inv./366/2025)	**BH ID:**	BH-(-09)	**Contractor:**	Goma Engineering & Consultancy
		Chainage [km]:	0-224	**Method of Drilling:**	Rotary Drilling
Client:	Noida Metro Rail Corporation (NMRC) Limited	**Depth [m]:**	30.00	**Start Date:**	11-03-2026
Stretch:	Noida Sector-142 to Botanical Garden	**Elevation [m]:**	195	**End Date:**	11-03-2026
Project Code:	158_R01_Noida Sector-142 to Botanical Garden_0-372 km TO 12+130 km	**Water table Level [m]:**	13.00	**Location:**	Lat. 28.56542, Long. 77.333116

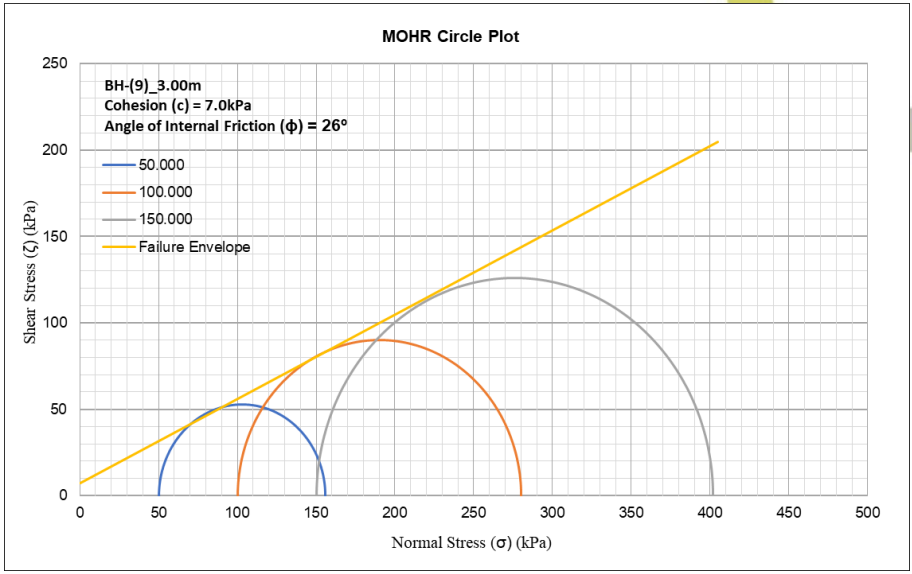
Depth [m]	Sample Type	Descriptions	SPT Test Results					Soil Particles				Atterberg Limits			Physical Characteristics				Direct Shear Test			Triaxial Comp Test			Consolidation Test		
			N1 (Seating Drive)	N2 (First Drive)	N3 (Second Drive)	Observed SPT	N (Correct N)	Gravel [%]	Sand [%]	Silt [%]	Clay [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	Moisture Content [%]	Bulk Density [gm/cm^3]	Dry Density [gm/cm^3]	Specific Gravity	Type	Cohesion [kg/cm^2]	Angle of Friction [°]	Type	Cohesion [kPa]	Angle of Friction [°]	Swelling Index	Consolidation Index	Preconsolidation Pressure [kg/cm^2]
0.00	DS	Top Soil						7.8	63.6	18.3	10.4	24	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
1.50	SPT/DS	Loose, Dark Brownish to Grayish, fine-grained silty sand (SM)	2	2	3	5	7	5.3	64.9	21.3	8.5	26	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
3.00	UDS							10.1	62.2	19.1	8.7	24	NP	NP	12.7	1.83	1.62	2.65	F	0.05	20	UU	7	26	-	-	-
3.50	SPT/DS		2	3	4	7	8	-																			
4.50	SPT/DS		3	4	5	9	9	8.7	60.9	21.6	8.8	27	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
6.00	UDS							12.2	64.3	16.5	7.0	22	NP	NP	16.81	1.85	1.58	2.64	F	0.07	23	UU	9	24	-	-	-
6.50	SPT/DS	Medium Dense,Grayish, fine-grained silty sand (SM)	4	6	7	13	12	-																			
7.50	SPT/DS		6	8	9	17	15	9.0	71.2	13.7	6.1	23	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
9.00	DS							1.7	84.4	9.0	4.9	21	NP	NP	15.48	-	-	2.67	F	0.03	24	-	-	-	-	-	-
9.50	SPT/DS		7	9	10	19	16	-																			
10.50	SPT/DS		9	11	15	26	21	8.8	64.2	19.0	8.0	25	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
12.00	DS							1.0	75.0	17.2	6.8	26	NP	NP	17.30	-	-	2.72	F	0.02	26	-	-	-	-	-	-
12.50	SPT/DS	Dense, Grayish, fine-grained silty sand (SM)	12	15	18	33	25	-																			
13.50	SPT/DS		15	19	24	43	23	12.4	65.5	15.4	6.7	28	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
15.00	DS							0.5	73.4	18.4	7.8	29	NP	NP	16.92	-	-	2.61	F	0.04	28	-	-	-	-	-	-
15.50	SPT/DS		17	21	27	48	24	-																			
16.50	SPT/DS	Very Dense, Brownish to Grayish, fine-grained silty sand and Gravel (SM)	20	25	31	56	27	5.6	65.9	18.7	9.9	24	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
18.00	DS							0.0	77.2	15.2	7.6	26	NP	NP	21.96	-	-	2.65	F	0.02	29	-	-	-	-	-	-
18.50	SPT/DS		20	24	30	54	25	-																			
19.50	SPT/DS		24	30	34	64	28	6.1	64.0	20.8	9.0	23	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
21.00	DS							0.3	77.2	15.9	6.6	24	NP	NP	20.86	-	-	2.78	F	0.01	30	-	-	-	-	-	-
21.50	SPT/DS		25	30	37	67	29	-																			
22.50	SPT/DS		32	40	48	88	35	11.8	68.1	14.0	6.2	25	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
24.00	DS							0.0	77.2	16.2	6.6	28	NP	NP	20.54	-	-	2.63	F	0.06	31	-	-	-	-	-	-
24.50	SPT/DS		45	(50/10 cm)		100	38	-																			
25.50	SPT/DS		48	(50/9 cm)		100	37	10.0	66.9	17.7	5.4	26	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
27.00	DS							3.0	72.5	16.4	8.0	27	NP	NP	20.79	-	-	2.69	F	0.00	32	-	-	-	-	-	-
27.50	SPT/DS		50	(50/8 cm)		100	36	-																			
28.50	SPT/DS		(50/12 cm)			100	36	10.0	66.9	14.4	8.7	26	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-
30.00	DS							0.0	74.2	18.5	7.3	23	NP	NP	20.59	-	-	2.62	F	0.07	31	-	-	-	-	-	-
30.50	SPT/DS		(50/10 cm)			100	35	-																			

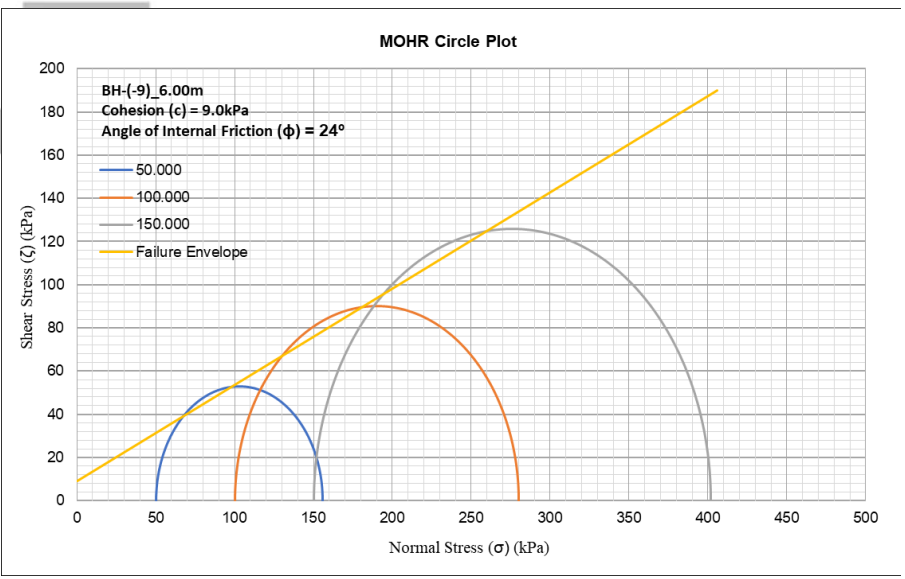
Notations: UDS = Undisturbed Sample, DS = Disturbed Sample, RC = Rock Core, F = Fast, S = Slow, UU = Unconsolidated Undrained Tri-axial compression Test, NP = Non Plastic.

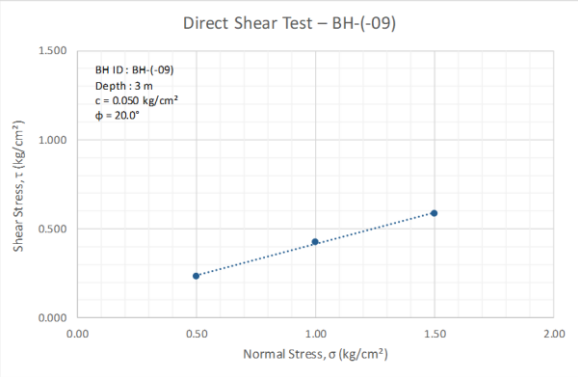

Grain Size Distribution Curve
BH-9_0.00m
BH-9_1.50m
BH-9_3.00m
BH-9_4.50m
BH-9_6.00m
BH-9_7.50m
BH-9_9.00m
Percent Finer (%)
Particle Size (mm)

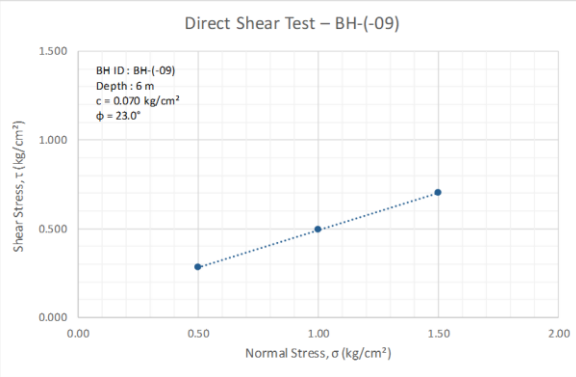

Grain Size Distribution Curve
BH-9_10.50m
BH-9_12.00m
BH-9_13.50m
BH-9_15.00m
BH-9_16.50m
BH-9_18.00m
BH-9_19.50m
Percent Finer (%)
Particle Size (mm)

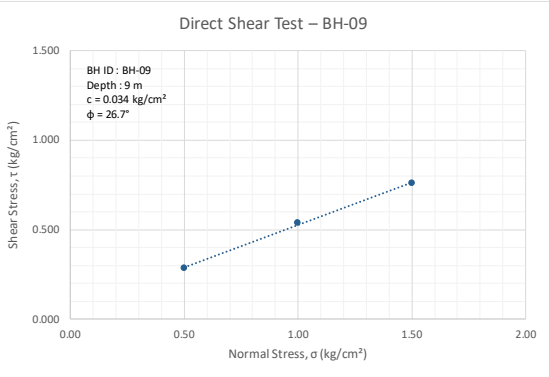

Grain Size Distribution Curve
BH-9_21.00m
BH-9_22.50m
BH-9_24.00m
BH-9_25.50m
BH-9_27.00m
BH-9_28.50m
BH-9_30.00m
Percent Finer (%)
Particle Size (mm)

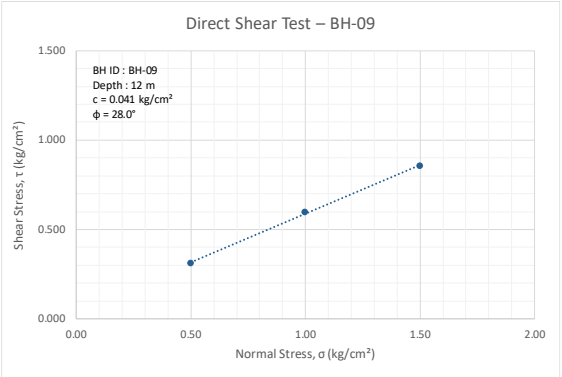

MOHR Circle Plot
BH-(9)_3.00m
Cohesion (c) = 7.0kPa
Angle of Internal Friction (ϕ) = 26°
50.000
100.000
150.000
Failure Envelope
Shear Stress (ζ) (kPa)
Normal Stress (σ) (kPa)

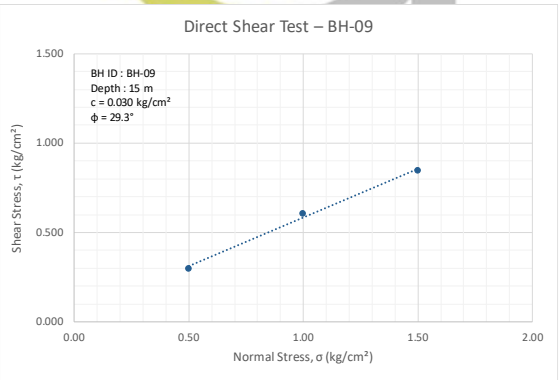

MOHR Circle Plot
BH-(-9)_6.00m
Cohesion (c) = 9.0kPa
Angle of Internal Friction (ϕ) = 24°
50.000
100.000
150.000
Failure Envelope
Shear Stress (ζ) (kPa)
Normal Stress (σ) (kPa)

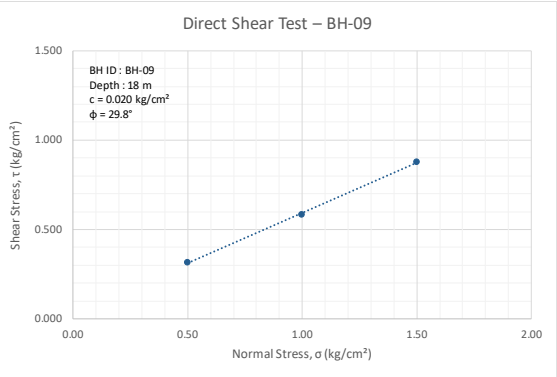

Direct Shear Test – BH-(-09)
BH ID : BH-(-09)
Depth : 3 m
c = 0.050 kg/cm²
ϕ = 20.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)

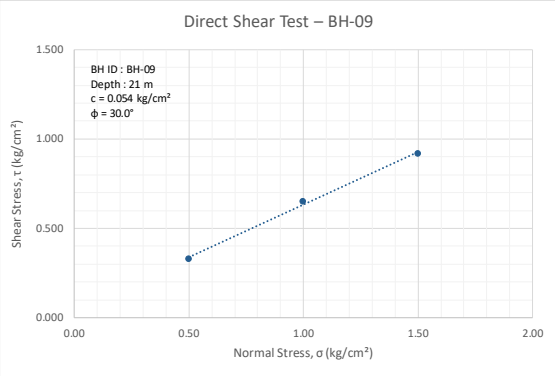

Direct Shear Test – BH-(-09)
BH ID : BH-(-09)
Depth : 6 m
c = 0.070 kg/cm²
ϕ = 23.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)

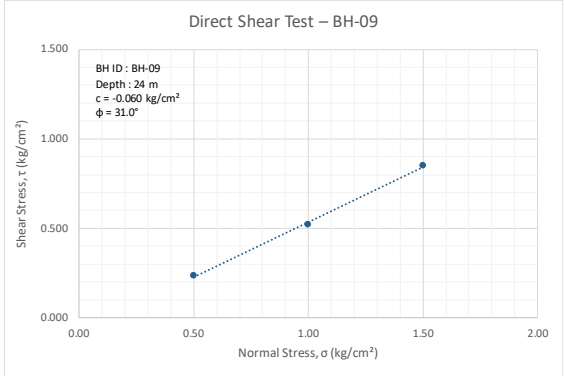

Direct Shear Test – BH-09
BH ID : BH-09
Depth : 9 m
c = 0.034 kg/cm²
ϕ = 26.7°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)

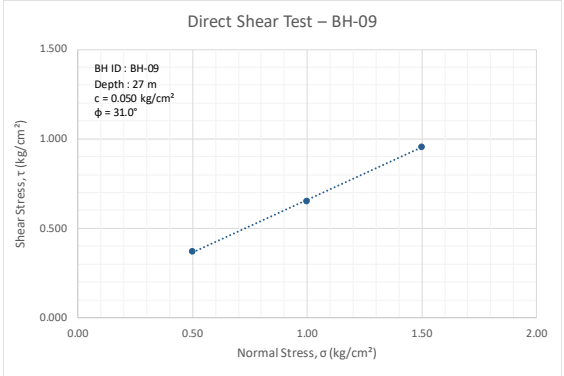

Direct Shear Test – BH-09
BH ID : BH-09
Depth : 12 m
c = 0.041 kg/cm²
ϕ = 28.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)

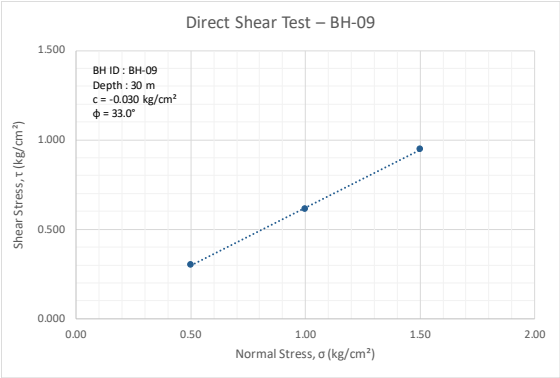

Direct Shear Test – BH-09
BH ID : BH-09
Depth : 15 m
c = 0.030 kg/cm²
ϕ = 29.3°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)


Direct Shear Test – BH-09
BH ID : BH-09
Depth : 18 m
c = 0.020 kg/cm²
ϕ = 29.8°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)


Direct Shear Test – BH-09
BH ID : BH-09
Depth : 21 m
c = 0.054 kg/cm²
ϕ = 30.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00


Direct Shear Test – BH-09
BH ID : BH-09
Depth : 24 m
c = -0.060 kg/cm²
ϕ = 31.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00


Direct Shear Test – BH-09
BH ID : BH-09
Depth : 27 m
c = 0.050 kg/cm²
ϕ = 31.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00


Direct Shear Test – BH-09
BH ID : BH-09
Depth : 30 m
c = -0.030 kg/cm²
ϕ = 33.0°
Shear Stress, τ (kg/cm²)
Normal Stress, σ (kg/cm²)
1.500
1.000
0.500
0.000
0.00
0.50
1.00
1.50
2.00