GEOTECHNICAL REPORT

PROPOSED 66 KV GRID SUBSTATION PROJECT AT AIIMS, NEW DELHI

SUBMITTED TO:

M/s. BSES Rajdhani Power Limited
1st Floor, C-Block, BSCS Bhawan, Nehru Place, Delhi - 110019

Project No. 18012 | Dated. February, 2018 | Revision-0

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February 7th, 2018 Project No. 18012

M/s. BSES Rajdhani Power Limited
1st Floor, C-Block, BSCS Bhawan,
Nehru Place, Delhi - 110019

Sub: Final Report on Soil Investigation Work for Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

We have carried out the soil investigation work in accordance with your Work Order No. SER/DSC/23559160 dated December 27th, 2017. We thank you for your business, and hope that you are satisfied with our services rendered.

This Final Report presents our findings based on the soil investigation conducted by us at the project site. This report presents the field and laboratory test data along with our engineering recommendations, which shall help you in deciding the optimum foundation arrangement for use on site.

We have prepared this report based on our findings on site as well as our experience gained in our previous projects completed over the past 15 years. We appreciate the opportunity to perform this investigation for you and have pleasure in submitting this report. Please contact us when we can be of further service to you.

Yours faithfully,
RAO ENGINEERING ENTERPRISES

Rao Engineering Enterprises New Delhi

(G.R.RAO)

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1.0 INTRODUCTION

1.1 Project Description

This soil investigation work, whose results are being presented herewith, has been carried out for Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

M/s. Rao Engineering Enterprises has been retained by M/s. BSES Rajdhani Power Limited for carrying out the geotechnical investigation at the project site. The test locations at the site were provided to us by the client. A layout plan illustrating the test locations of our field investigation is presented on Sheet No. 1.

1.2 Aim of Soil Investigation

Soil investigation has been conducted at the site in order to evaluate the parameters required for design of foundations. These parameters are:

a) Type of foundation on which the proposed super structure will be supported.

b) Depth of foundation, and

c) Allowable bearing pressure at the founding level.

To evaluate these parameters, following engineering properties of the Sub-Soil have been studied:

Sub-soil penetration resistance characteristics which have been determined insitu. Properties like particle size distribution, atterberg's limits, bulk density, moisture content, and shear strength parameters; which have been determined in the laboratory by conducting testing of both disturbed as well as undisturbed samples.

1.3 Scope of Work

The stipulated scope of work comprised of the following:

1. Mobilization of equipment and personnel to the site and back.
2. Sinking eight (8) boreholes to 15.0 m depth or refusal whichever is encountered earlier, observing ground water table levels, conducting required field and laboratory tests and their analysis.
3. conducting one (1) electrical resistivity test (ERT's) to provide data for the grounding systems;
4. Preparation and submission of technical report in triplicate.

2.0 FIELD INVESTIGATIONS

2.1 Soil Borings

The boreholes were progressed using mechanized shell and auger drilling rig to the specified depth. The diameter of the borehole was 150 mm. Where caving of the borehole

occurred, casing was used to keep the borehole stable. The work was in general accordance with IS: 1892-1979.

Standard Penetration Tests (SPT) were conducted in the boreholes at 1.5 m depth interval up to 15 m depth. The tests were conducted by connecting a split spoon sampler to 'A' rods and driving it by 45 cm using a 63.5 kg hammer falling freely from a height of 75 cm. The tests were conducted in accordance with IS: 2131-1981.

The number of blows for each 15 cm of penetration of the split spoon sampler was recorded. The blows required to penetrate the initial 15 cm of the split spoon for seating the sampler is ignored due to the possible presence of loose materials or cuttings from the drilling operation. The cumulative number of blows required to penetrate the balance 30 cm of the 45 cm sampling interval is termed the SPT value or the 'N' value.

Where the split spoon sampler did not penetrate the initial 15 cm seating in a total of 100 blows, it is indicated "Ref" for an indicated amount of penetration. The 'N' values are presented on the soil profile for each borehole.

Disturbed samples were collected from the split spoon after conducting SPT. The samples were preserved in transparent polythene bags. Undisturbed soil samples were collected by attaching 75 mm diameter thin walled 'Shelby' tubes and driving the sampler by light-hammering using a 63.5 kg hammer in accordance with IS: 2132-1986. The tubes were sealed with wax at both ends. All samples were transported to our laboratory for further examination and testing.

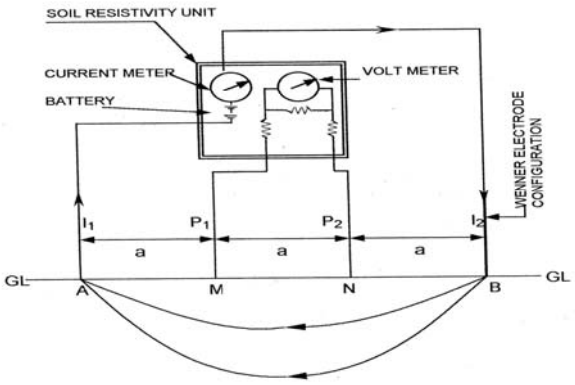
2.2 Groundwater

Groundwater level was measured in the boreholes after drilling and sampling was completed. The measured water levels are recorded on the individual soil profiles.

2.3 Electrical Resistivity Tests

Electrical resistivity of the substratum (soil) at the site was determined at specified locations. The electrical resistivity test is used for shallow subsurface exploration by means of electrical measures made at the ground surface. Resistivity measurements are made by driving four electrodes about 10 to 15 cm in to the ground at pre-selected electrode spacing. We used the Wenner electrode configuration for this study.

The schematic arrangement of electrodes is shown below:



NOTE: I_1 AND I_2 ARE CURRENT ELECTRODES

P_1 AND P_2 ARE POTENTIAL ELECTRODES

The four electrodes were spaced at equal distance along a line. The test procedure is in accordance with IS: 3043:1987 RA 2006.

Measurements are made by causing a current, 'I', to pass through the earth and distribute within a relatively large hemispherical earth mass. The portion of the current that flows along the surface produces a voltage drop, 'V'. The resistance 'R', ratio of voltage drop 'V' to current 'I' is directly measured by Digital Earth Resistance Tester. The resistivity is determined from the following equation:

$$\rho = 2 \pi a R$$

where:

ρ = apparent resistivity, ohm-m
a = spacing between the electrodes, meter
R = resistance, ohms

Results are presented as semi-logarithmic plot of apparent resistivity versus electrode spacing, as well as in the form of polar curves, as specified by IS: 3043:1987 RA 2006.

3.0 LABORATORY TESTS

Laboratory tests have been conducted on various selected soil samples in the laboratory:

Laboratory Test	IS Code Referred
Bulk Density	By calculations
Natural Moisture Content	IS : 2720 (Part-2)-1973, RA-2010
Specific Gravity	IS : 2720 (Part-3)-1980, RA-2007
Grain Size Analysis	IS : 2720 (Part-4)-1985, RA-2010
Liquid Limit and Plastic Limit	IS : 2720 (Part-5)-1985, RA-2010
Unconfined Compression Test	IS : 2720 (Part-10)-1991, RA-2010
Unconsolidated Undrained Triaxial Shear Test	IS : 2720 (Part-11)-1993, RA-2007
Consolidated Drained Direct Shear Test	IS : 2720 (Part-13)-1986, RA-2010

4.0 GENERAL SITE CONDITIONS

4.1 Site Stratigraphy

A heterogenous fill consisting of silty sand with brick bats was encountered to about 2-4m depth below EGL. Below fill material, sandy silt was encountered to the final explored depth of 15.5 m with discontinuous layer of silty sand.

The field SPT N-values generally range from 4 to 31 to about 4 m depth and range from 8 to 15 to about 6 m depth below EGL. Below this, field SPT N-values generally range from 10 to 31 to about 9 m depth and range from 29 to 38 to about 12 m depth. Further SPT N-values range from 38 to 61 to the final explored depth of 15.45 m.

All test results are presented on the individual soil profiles on Sheet No. 2 to 17. A summary of the borehole profiles is illustrated on Sheet No. 18 & 19. Plots of field and corrected SPT values versus depth are presented on Sheet No. 20 to 23.

4.2 Groundwater

Based on our measurements in the completed boreholes, groundwater was not met to the maximum explored depth of 15.45 m during the period of our field investigations (January, 2018). Fluctuations may occur in the measured ground levels due to seasonal variations in rainfall, surface evaporation rates.

5.0 FIELD TEST RESULTS

5.1 Electrical Resistivity Test Result

One (1) electrical resistivity test was conducted at the project site as per IS: 3043-1987. The test was conducted using the Wenner's configuration. The apparent resistivity value obtained has been analyzed to generate the polar curve. The polar curve is used to compute the mean resistivity.

Mean resistivity value at the electrical resistivity test (ERT) location is summarized in the table below:

Test Designation	Mean Resistivity, ohm-m	Corrosion potential*	Presentation of Results
ERT-1	55.7	Moderately Corrosive	Fig. 24 & 25

* As per Clause 8.6.1 of Amendment No. 2 to IS: 3043-1987, dated January 2010.

The above value may be used for design of the electrical grounding system. The data may also be used to assess the corrosion potential for buried utility lines as per the guideline given in IS 3043-1987.

6.0 FOUNDATION ANALYSIS

6.1 General

For designing the foundation system, the following parameters are required:

a) Suitable type of foundation on which the proposed super-structure can be supported.

b) Depth of these foundations, and

c) Allowable bearing pressure at the founding level corresponding to various footing sizes.

A suitable foundation for any structure should have an adequate factor of safety against exceeding the bearing capacity of the supporting soils. Also, the vertical movements due to compression of the soils should be within tolerable limits for the structure. We consider that foundation designed in accordance with the recommendations given herein will satisfy these criteria.

6.2 Liquefaction Susceptibility Assessment

Liquefaction is defined as the transformation of a granular material from a solid to a liquefied state as a consequence of increased pore-water pressure and reduced effective stress (Marcuson, 1978)[1]. Increased pore pressure may be induced by the tendency of granular materials to compact when subjected to cyclic shear deformation, such as in the event of an earthquake.

As per IS: 1893-2016, liquefaction is likely to occur in loose fine sand below water table. Since groundwater was not met to the final explored depth of 15.5 m during the period of our field investigation (January, 2018), we are of the opinion that liquefaction is not likely to occur at the project site in the event of an earthquake.

According to Fig.1 of IS: 1893 (Part-1)-2016 showing seismic zones, the project site falls under Zone-IV. The design for seismic forces should be done considering the project site in Zone-IV.

6.3 Foundation Type and Depth

Type of foundation to be adopted for a particular structure depends upon the loading intensity at the foundation level and the configuration of loading points.

Reviewing the stratigraphy of the site on the basis of boreholes data, SPT values & laboratory test results, we are of the opinion that open/raft foundation is feasible foundation scheme to support the structural load.

As discussed in Section 4.1, fill is encountered at the site to about 2-4 m depth below EGL. We don't recommend any foundation at fill strata. Our recommended values of net allowable bearing pressures at minimum 4.5 m depth for open foundation are presented in Section 6.0.

If the recommended safe bearing pressure for open foundation is insufficient to support the structural loads, option of pile foundations may be considered. Recommendations are presented herein for 400 mm, 500 mm and 600 mm diameter RCC bored cast-in-situ piles.

Interconnecting beams should be provided either at plinth level or at foundation level in order to restrict differential settlements and to provide rigidity to the structure during earthquakes.

6.4 Allowable Bearing Pressure

Following criterion have been considered for evaluating the bearing capacity values:

(a) Settlement criteria

(b) Shear failure criterion

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

Shear failure condition as per I.S. 6403 has been considered for allowable bearing pressure computation. Allowable settlement value of 40 mm & 50 mm has been considered for deducing shear strength value.

6.5 Sample Calculations (Open Foundation)

Type of foundation	Open foundation
Depth of foundation	4.5 m. below EGL
Width of foundation	3.0 m

I. SETTLEMENT CRITERIA (AS PER IS - 8009, PART-1, 1976, FIG.9, PAGE-17)

Weighted Average minimum Corrected 'N' value	13
Settlement undergone by footing per unit pressure	23.9 mm
Total Settlement undergone by footing (considering water table Correction factor taken as 0.6 for Worst condition)	49.6 mm
Allowable bearing pressure Corresponding to 50 mm allowable Settlement.	13.0 T/m²

III. SHEAR FAILURE CRITERION

The bearing capacity equation used is as follows:

$$q_{net\ safe} = \frac{1}{F}\left[cN_c\zeta_c\, d_c + q(N_q-1)\,\zeta_q d_q + 0.5\, B\,\Upsilon\, N_\gamma \zeta_\gamma\, d_\Upsilon R_w\right]$$

Where:

$q_{net\ safe}$ = safe net bearing capacity of soil based on the shear failure criterion.
q = overburden pressure
R_w = water table correction factor
F = Factor of safety, taken as equal to 2.5 in accordance with IS: 1904-1986.
$\zeta_c, \zeta_q, \zeta_\gamma$ = Shape factors. For Strip footings, $\zeta_c = \zeta_q = \zeta_\gamma = 1$
For Square footing, $\zeta_c = 1.3$, $\zeta_q = 1.2$, $\zeta_\gamma = 0.6$
d_c, d_q, d_γ = Depth factors

For $\phi \leq 10$, $d_c = 1 + 0.2 \tan(45 + \phi/2)\, D/B$, $d_q = d_\gamma = 1$
For $\phi > 10$, $d_q = d_\gamma = 1 + 0.1 \tan(45 + \phi/2)\, D/B$

Cohesion, c = 6.0 T/m²

Angle of shearing resistance, ϕ = 6 degrees

Bearing Capacity factors:

General Shear Failure :	N_c =	6.81	N_q =	1.72	N_γ =	0.57
Local Shear Failure :	N_c' =	6.19	N_q' =	1.43	N_γ' =	0.34

Density at Foundation Level, γ = 1.75 gms/cc
Net Safe Bearing Capacity , $q_{net\ safe}$ = 20.0 T/m²
(considering average of local & general shear criteria)

6.6 Definition of Gross and Net Bearing Pressure

For the purposes of this report, the net allowable bearing pressure should be calculated as the difference between total load on the foundation and the weight of the soil overlying the foundation divided by the effective area of the foundation. The gross bearing pressure is the total pressure at the foundation level including overburden pressure and surcharge load.

The following equations may be used –

$$q_{net} = [(P_s + W_f + W_s) / A_f] - S_v$$

$$q_{gross} = q_{net} + S_v = (P_s + W_f + W_s) / A_f$$

where:

q_{net} = net allowable bearing pressure
q_{gross} = gross bearing pressure
P_s = superimposed static load on foundation
W_f = weight of foundation
W_s = weight of soil overlying foundation
A_f = effective area of foundation
S_v = overburden pressure at foundation level prior to excavation for foundation.

It may please be noted that safe bearing pressures recommended in this report refer to ***"net values"***. Where filling is done, it should be treated as a surcharge over the foundation.

7.0 RECOMMENDATIONS

- **Open Foundation: -**

The following table presents our recommended values of net allowable bearing pressures for open/raft foundations bearing at 4.5-5.5 m depth below EGL:

Foundation Depth below EGL, m	Recommended Net Allowable Bearing Pressure, T/m²	
	Total Settlement = 40 mm	Total Settlement = 50 mm
4.5	10.4	13.0
5.5	12.0	15.0

The above values include a safety factor of 2.5. The appropriate value of net bearing pressure may be selected as per the permissible settlement criterion.

Net bearing pressure for foundations at intermediate depths may be interpolated linearly between the values given above. Fill placed above EGL should be treated as surcharge load. Foundation should be seated into natural soil.

In order to restrict the influence of adjacent footings on each other, the lateral edge-to-edge spacing between the foundations should at least be equal to "0.8B" where "B" is the width of the larger footing.

- **Pile Foundation: -**

Pile capacity analysis for RCC bored cast-in-situ piles for the proposed structure has been done considering the following boundary conditions:

- Pile cut-off-level : 1.0 m below average ground level
- Overburden Pressure : Assumed to become constant below 15 times pile diameters
- Pile Head : Fixed Head Condition (for lateral capacity analysis)

The following table presents our recommended safe pile capacities for 400 mm, 500 mm and 600 mm diameter bored piles at the sites of the proposed structures:

Pile Diameter, mm	Pile Length below COL, m	Recommended Pile Capacities, MT		
		Compression	Pullout	Lateral*
400	10	21	14	1.9
	12	29	18	
	14	33	22	
500	10	28	19	2.8
	12	38	24	
	14	44	29	
600	10	36	24	3.7
	12	49	30	
	14	56	37	

* For M-25 grade concrete, for 5 mm deflection at the pile cut of level.

The following points are highlighted with reference to the above-recommended capacities:

1. The above values are based on IS: 2911(Part-1 Section 2) -2010 and include safety factor of 2.5 for compressive loads, and a safety factor of 3.0 for uplift loads.

2. Safe pile capacities for piles of intermediate lengths may be interpolated linearly between the values given above.

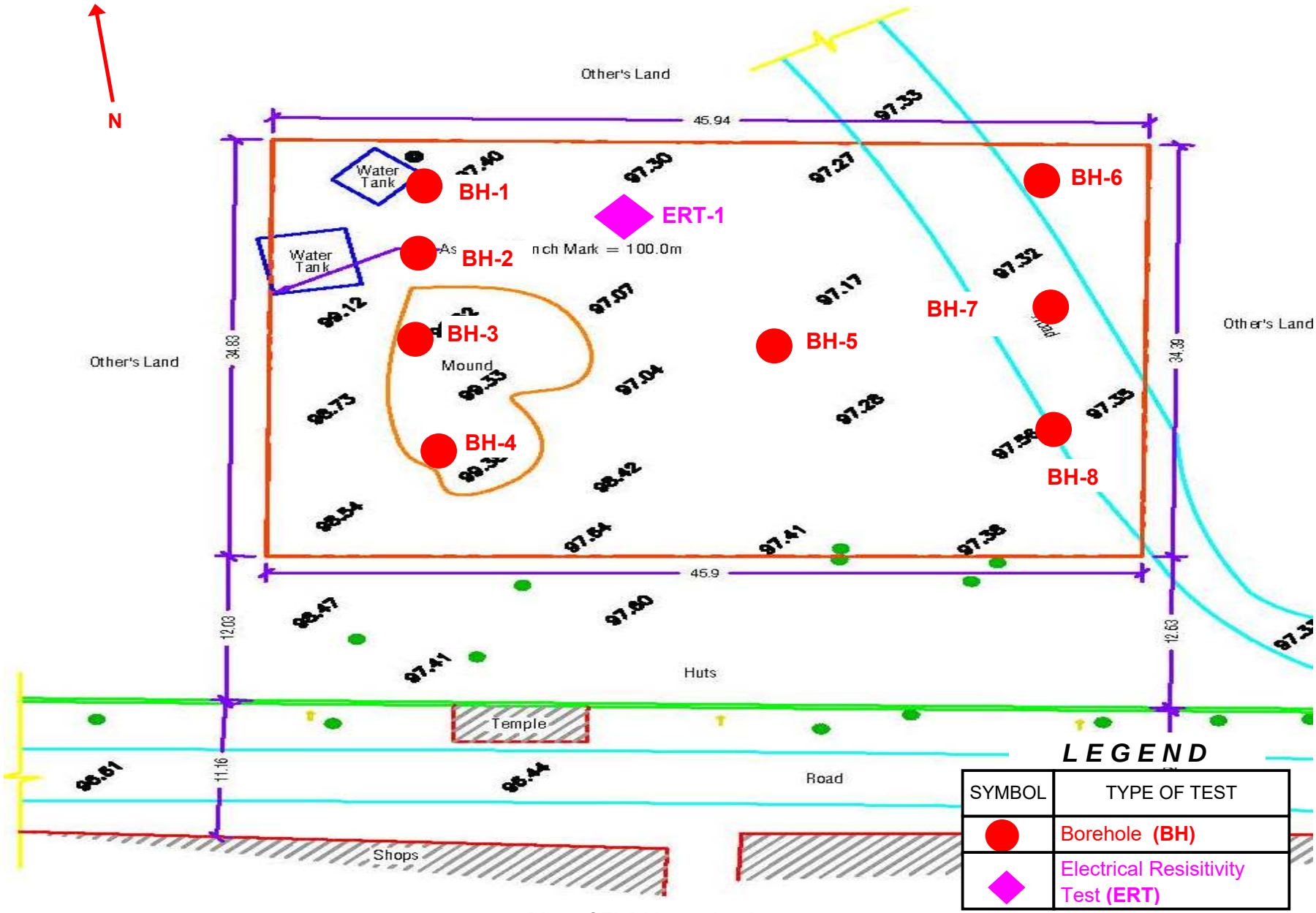
3. It should be ensured that the bottom of the pile bore is cleaned properly before casting the pile. This is important because the soil particles tend to settle down at the bottom of the pile bore, which may cause reduction in pile capacities.

4. The capacities given above may be taken as a guideline for initial design. Final pile capacities should be confirmed by conducting initial pile load tests as per IS: 2911-Part-IV. Also, routine load tests should be conducted on sufficient working piles to ensure that the piles are safe for the design loads.

5. Low strain pile integrity tests (PIT) should be done on all working piles as a quality check.

8.0 VARIABILITY IN SUBSURFACE CONDITIONS

Subsurface conditions encountered during construction may vary somewhat from the conditions encountered during the site investigation. In case significant variations are encountered during construction, we request to be notified so that our engineers may review the recommendations in this report in light of these variations.



Plan of Field Investigations

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

SOIL PROFILE: BH-1

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.	Water Table, m :	Not Met	Project No.	18012
Date of Start:	29-Jan-18	Date of Completion:	29-Jan-18	Termination Depth, m :	15.45

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
0.50	1.00	DS-1			Fill: silty sand with brick bats															
1.50	1.95	SPT-1	7			2.00	13	52	32	3										
2.25	2.55	UDS-1			Grey silty sand (SM)		0	62	38	0				2.63	1.66	1.53	8.2	DST	0.00	28
3.00	3.45	SPT-2	7			4.00														
4.50	4.95	SPT-3	15		Brown sandy silt of low plasticity (ML-CL)						25.1	18.9	6.2							
5.25	5.55	UDS-2					0	29	66	5					1.80	1.62	11.3	UUT	0.70	10
6.00	6.45	SPT-4	30																	
7.50	7.95	SPT-5	44																	
8.25	8.55	UDS-3					0	21	73	6	25.9	19.5	6.4	2.66	1.88	1.68	11.8			
9.00	9.45	SPT-6	37			10.50														

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-1

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	29-Jan-18	Date of Completion:	29-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
10.50	10.95	SPT-7	52		Grey sandy silt of non plasticity (ML)		0	36	61	3										
11.25	11.55	UDS-4													1.90	1.72	10.5	DST	0.00	33
12.00	12.45	SPT-8	55																	
13.50	13.95	SPT-9	61																	
14.25	14.55	UDS-5					0	41	59	0				2.64	1.94	1.75	10.9			
15.00	15.45	SPT-10	56			15.45														

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-2

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.	Water Table, m :	Not Met	Project No.	18012
Date of Start:	28-Jan-18	Date of Completion:	28-Jan-18	Termination Depth, m :	15.45

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
0.50	1.00	DS-1			Fill: Sandy silt with brick bats		7	25	65	3										
1.50	1.95	SPT-1	10			2.00														
2.25	2.55	UDS-1			Grey silty sand (SM)										1.68	1.53	9.5	DST	0.00	30
3.00	3.45	SPT-2	8			4.00	0	63	37	0										
4.50	4.95	SPT-3	15		Brown sandy silt of low plasticity (ML-CL)						26.1	19.2	6.9							
5.25	5.55	UDS-2					0	23	71	6				2.66	1.80	1.63	10.3			
6.00	6.45	SPT-4	17																	
7.50	7.95	SPT-5	28																	
8.25	8.55	UDS-3					4	22	67	7	26.5	19.8	6.7		1.85	1.66	11.2	UUT	0.95	10
9.00	9.45	SPT-6	29																	

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-2

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	28-Jan-18	Date of Completion:	28-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
10.50	10.95	SPT-7	29		Brown sandy silt of low plasticity (ML-CL)															
11.25	11.55	UDS-4					3	26	66	5				2.65	1.89	1.68	12.3			
12.00	12.45	SPT-8	33																	
13.50	13.95	SPT-9	38																	
14.25	14.55	UDS-5					0	28	66	6	25.9	20.1	5.8		1.93	1.71	12.9	UUT	1.35	9
15.00	15.45	SPT-10	45			15.45														

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-3

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	28-Jan-18	Date of Completion:	28-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
0.50	1.00	DS-1			Fill: silty sand	2.50	5	52	43	0										
1.50	1.95	SPT-1	4																	
2.25	2.55	DS-2																		
3.00	3.45	SPT-2	9		Brown sandy silt of low plasticity (ML-CL)						25.6	19.5	6.1							
4.50	4.95	SPT-3	13				0	23	71	6				2.66						
5.25	5.55	UDS-2													1.80	1.62	11.2	UUT	0.70	10
6.00	6.45	SPT-4	27																	
7.50	7.95	SPT-5	26																	
8.25	8.55	UDS-3					0	27	68	5	24.3	18.5	5.8	2.65	1.87	1.67	11.8			
9.00	9.45	SPT-6	31																	

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-3

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.	Water Table, m :	Not Met	Project No.	18012
Date of Start:	28-Jan-18	Date of Completion:	28-Jan-18	Termination Depth, m :	15.45

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
10.50	10.95	SPT-7	33		Brown sandy silt of low plasticity (ML-CL)															
11.25	11.55	UDS-4				12.00	0	21	73	6	26.1	19.6	6.5		1.90	1.69	12.2	UUT	1.35	11
12.00	12.45	SPT-8	46		Grey sandy silt of non plasticity (ML)															
13.50	13.95	SPT-9	53				0	42	55	3				2.64						
14.25	14.55	UDS-5													1.87	1.68	11.5	DST	0.00	33
15.00	15.45	SPT-10	58			15.45	0	39	58	3										

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-4

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	27-Jan-18	Date of Completion:	28-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
0.50	1.00	DS-1			Fill: Sandy silt with brick bats	3.00	4	21	72	3										
1.50	1.95	SPT-1	4																	
2.25	2.55	DS-2																		
3.00	3.45	SPT-2	7		Brown sandy silt of low plasticity (ML-CL)		0	26	68	6										
4.50	4.95	SPT-3	11								25.2	18.6	6.6							
5.25	5.55	UDS-2													1.76	1.58	11.2	UUT	0.60	10
6.00	6.45	SPT-4	34																	
7.50	7.95	SPT-5	28																	
8.25	8.55	UDS-3					4	21	70	5	24.8	19.2	5.6		1.87	1.67	12.2	UUT	0.85	12
9.00	9.45	SPT-6	28																	

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-4

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	27-Jan-18	Date of Completion:	28-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
10.50	10.95	SPT-7	29																	
11.25	11.55	UDS-4			Brown sandy silt of low plasticity (ML-CL)		5	18	71	6					1.89	1.68	12.4			
12.00	12.45	SPT-8	32			13.50					25.4	18.9	6.5							
13.50	13.95	SPT-9	46				0	38	59	3										
14.25	14.55	UDS-5			Grey sandy silt of non plasticity (ML)										1.92	1.72	11.4	DST	0.00	33
15.00	15.45	SPT-10	54			15.45	0	41	56	3										

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-5

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.	Water Table, m :	Not Met	Project No.	18012
Date of Start:	31-Jan-18	Date of Completion:	31-Jan-18	Termination Depth, m :	15.45

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
0.50	1.00	DS-1			Fill: silty sand with brick bats	3.00	6	56	38	0										
1.50	1.95	SPT-1	9																	
2.25	2.55	DS-2																		
3.00	3.45	SPT-2	7		Brown sandy silt of low plasticity (ML-CL)						25.3	19.5	5.8							
4.50	4.95	SPT-3	15				0	25	69	6										
5.25	5.55	UDS-2													1.81	1.64	10.5	UUT	0.65	10
6.00	6.45	SPT-4	36																	
7.50	7.95	SPT-5	29								26.7	20.1	6.6							
8.25	8.55	UDS-3					0	18	75	7					1.85	1.66	11.2	UUT	0.90	9
9.00	9.45	SPT-6	21																	

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-5

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	31-Jan-18	Date of Completion:	31-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
10.50	10.95	SPT-7	33																	
11.25	11.55	UDS-4			Brown sandy silt of low plasticity (ML-CL)		4	23	67	6					1.88	1.68	11.9			
12.00	12.45	SPT-8	35			13.50					25.1	19.6	5.5							
13.50	13.95	SPT-9	48				0	41	59	0										
14.25	14.55	UDS-5			Grey sandy silt of non plasticity (ML)										1.91	1.72	11.1	DST	0.00	34
15.00	15.45	SPT-10	56			15.45	0	43	54	3										

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-6

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	29-Jan-18	Date of Completion:	30-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
0.50	1.00	DS-1			Fill: silty sand with brick bats	3.50	6	56	35	3										
1.50	1.95	SPT-1	31																	
2.25	2.55	DS-2					14	52	34	0										
3.00	3.45	SPT-2	24																	
4.50	4.95	SPT-3	8		Brown sandy silt of low plasticity (ML-CL)						25.6	19.8	5.8							
5.25	5.55	UDS-2					0	25	69	6				2.66	1.81	1.61	12.3	UUT	0.75	10
6.00	6.45	SPT-4	26																	
7.50	7.95	SPT-5	33																	
8.25	8.55	UDS-3					3	21	69	7	26.2	20.1	6.1	2.67	1.90	1.68	12.9			
9.00	9.45	SPT-6	34																	

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-6

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	29-Jan-18	Date of Completion:	30-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
10.50	10.95	SPT-7	32		Brown sandy silt of low plasticity (ML-CL)															
11.25	11.55	UDS-4					6	19	69	6	25.8	19.5	6.3		1.92	1.70	13.2	UCS	1.26	-
12.00	12.45	SPT-8	38																	
13.50	13.95	SPT-9	44																	
14.25	14.55	UDS-5									25.1	18.7	6.4	2.65	1.97	1.74	13.5	UUT	1.35	12
15.00	15.45	SPT-10	48			15.45	4	23	68	5										

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-7

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.	Water Table, m :	Not Met	Project No.	18012
Date of Start:	30-Jan-18	Date of Completion:	30-Jan-18	Termination Depth, m :	15.45

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
0.50	1.00	DS-1			Fill: Sandy silt with brick bats	4.00														
1.50	1.95	SPT-1	9				6	32	59	3										
2.25	2.55	DS-2																		
3.00	3.45	SPT-2	14																	
4.50	4.95	SPT-3	8		Brown sandy silt of low plasticity (ML-CL)						25.9	19.5	6.4							
5.25	5.55	UDS-2					0	19	75	6				2.66	1.75	1.56	12.2	UUT	0.70	11
6.00	6.45	SPT-4	10																	
7.50	7.95	SPT-5	14																	
8.25	8.55	UDS-3					0	23	72	5	24.5	17.8	6.7		1.87	1.66	12.9	UUT	0.90	9
9.00	9.45	SPT-6	31																	

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-7

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	30-Jan-18	Date of Completion:	30-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
10.50	10.95	SPT-7	30		Brown sandy silt of low plasticity (ML-CL)															
11.25	11.55	UDS-4					5	28	61	6				2.67	1.91	1.68	13.5			
12.00	12.45	SPT-8	38																	
13.50	13.95	SPT-9	41																	
14.25	14.55	UDS-5					6	24	65	5	24.1	18.2	5.9	2.65	1.96	1.72	13.8	UUT	1.30	10
15.00	15.45	SPT-10	46			15.45														

UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-8

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.			Water Table, m :	Not Met	Project No.	18012
Date of Start:	30-Jan-18	Date of Completion:	31-Jan-18	Termination Depth, m :	15.45		

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
0.50	1.00	DS-1			Fill: silty sand with brick bats	1.50	7	26	64	3										
1.50	1.95	SPT-1	4								25.6	19.5	6.1							
2.25	2.55	UDS-1					0	21	73	6				2.66	1.73	1.55	11.5	UUT	0.55	10
3.00	3.45	SPT-2	11																	
4.50	4.95	SPT-3	20																	
5.25	5.55	UDS-2			Brown sandy silt of low plasticity (ML-CL)		3	25	67	5					1.82	1.64	10.9	UUT	0.75	12
6.00	6.45	SPT-4	23																	
7.50	7.95	SPT-5	23																	
8.25	8.55	UDS-3					6	18	70	6	26.2	19.8	6.4	2.65	1.87	1.67	11.8			
9.00	9.45	SPT-6	26																	

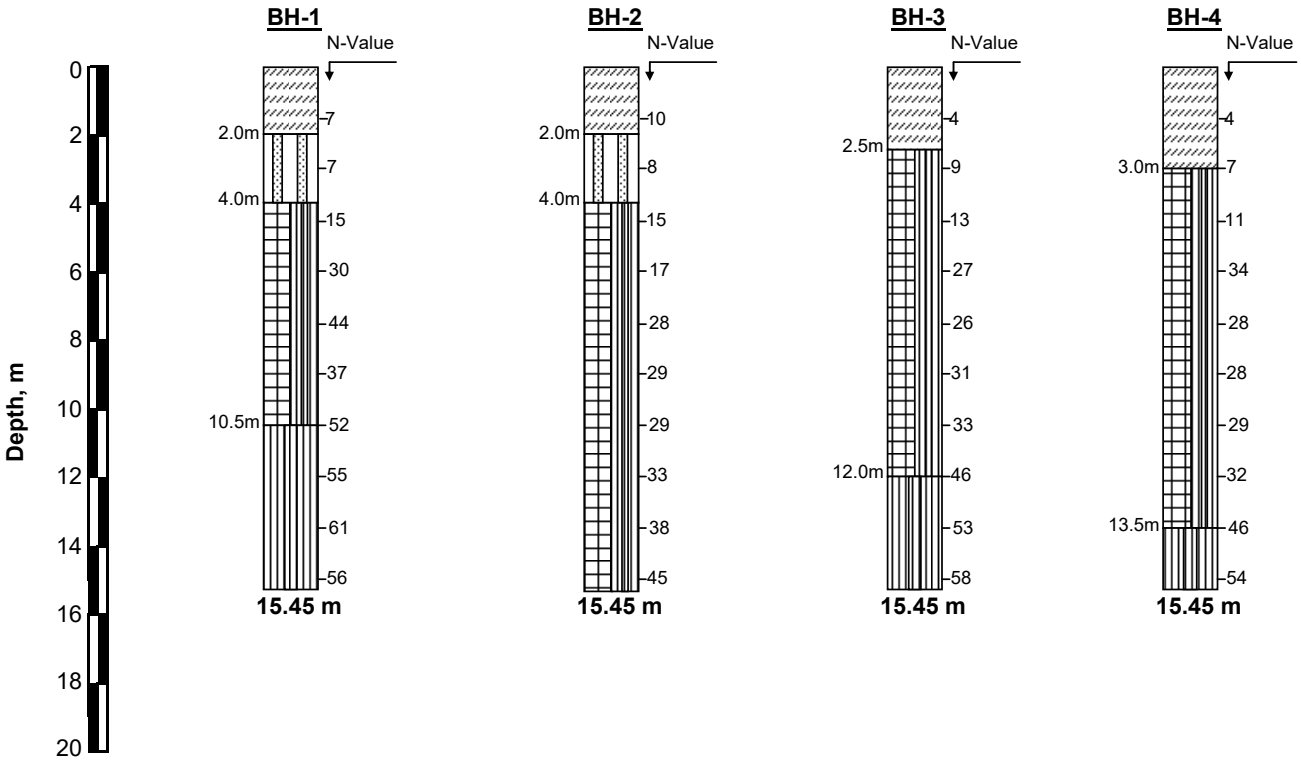
UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +

SOIL PROFILE: BH-8

Project:	Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.	Water Table, m :	Not Met	Project No.	18012
Date of Start:	30-Jan-18	Date of Completion:	31-Jan-18	Termination Depth, m :	15.45

Depth, m		Sample No.	Field SPT 'N' Value	Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Specific Gravity	Density and Moisture			Shear Tests		
From	To						Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)	Type of Test	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, f (degrees)
10.50	10.95	SPT-7	29		Brown sandy silt of low plasticity (ML-CL)															
11.25	11.55	UDS-4				12.00	3	25	66	6	25.8	19.9	5.9	2.67	1.90	1.69	12.2	UUT	1.20	11
12.00	12.45	SPT-8	44		Grey sandy silt of non plasticity (ML)		0	39	58	3										
13.50	13.95	SPT-9	48																	
14.25	14.55	UDS-5													1.90	1.71	11.1	DST	0.00	33
15.00	15.45	SPT-10	57			15.45	0	43	57	0				2.63						

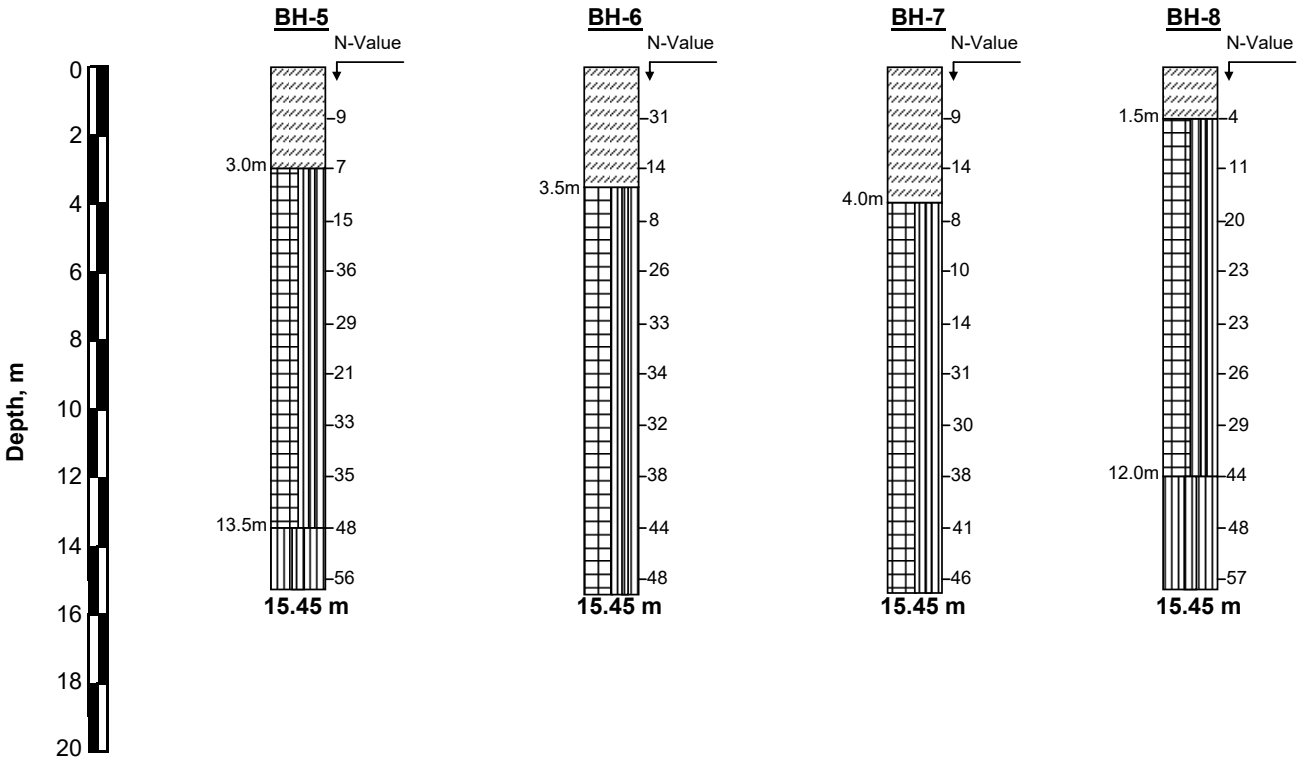
UUT : Unconsolidated Undrained Triaxial Shear Test DST: Drained Direct Shear Test, UCS : Unconfined Compressive Strength Remoulded Sample +



LEGEND	
SYMBOL	DESCRIPTION
	Filled up
	Sandy silt (ML)
	Silty sand (SM)
	Sandy silt (ML-CL)

Summary of Borehole Profiles

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



LEGEND	
SYMBOL	DESCRIPTION
	Filled up
	Sandy silt (ML)
	Sandy silt (ML-CL)

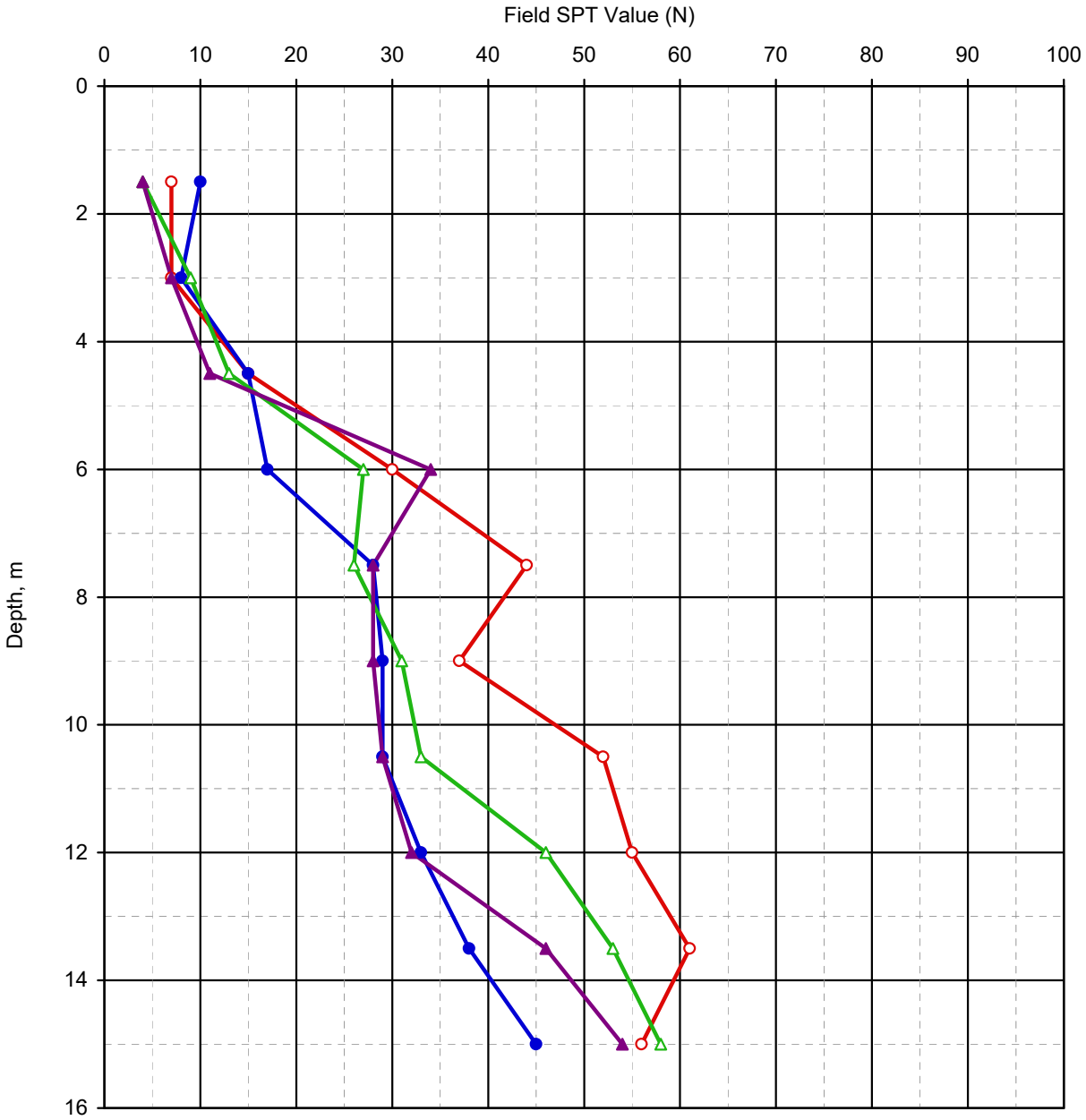
Summary of Borehole Profiles

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details	
Symbol	Borehole Number
	BH-1
	BH-2
	BH-3
	BH-4



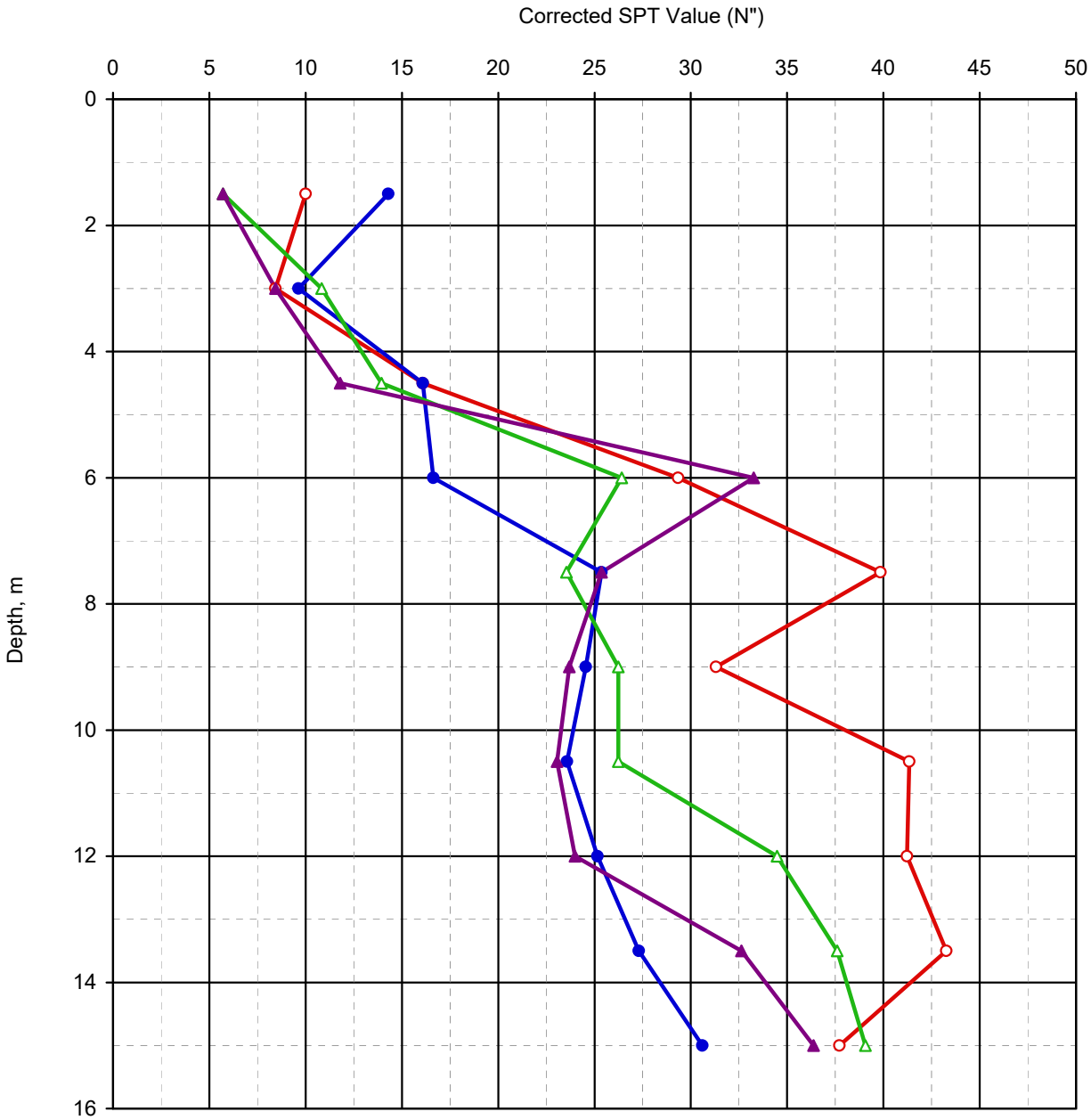
Field SPT Values vs. Depth

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details	
Symbol	Borehole Number
	BH-1
	BH-2
	BH-3
	BH-4



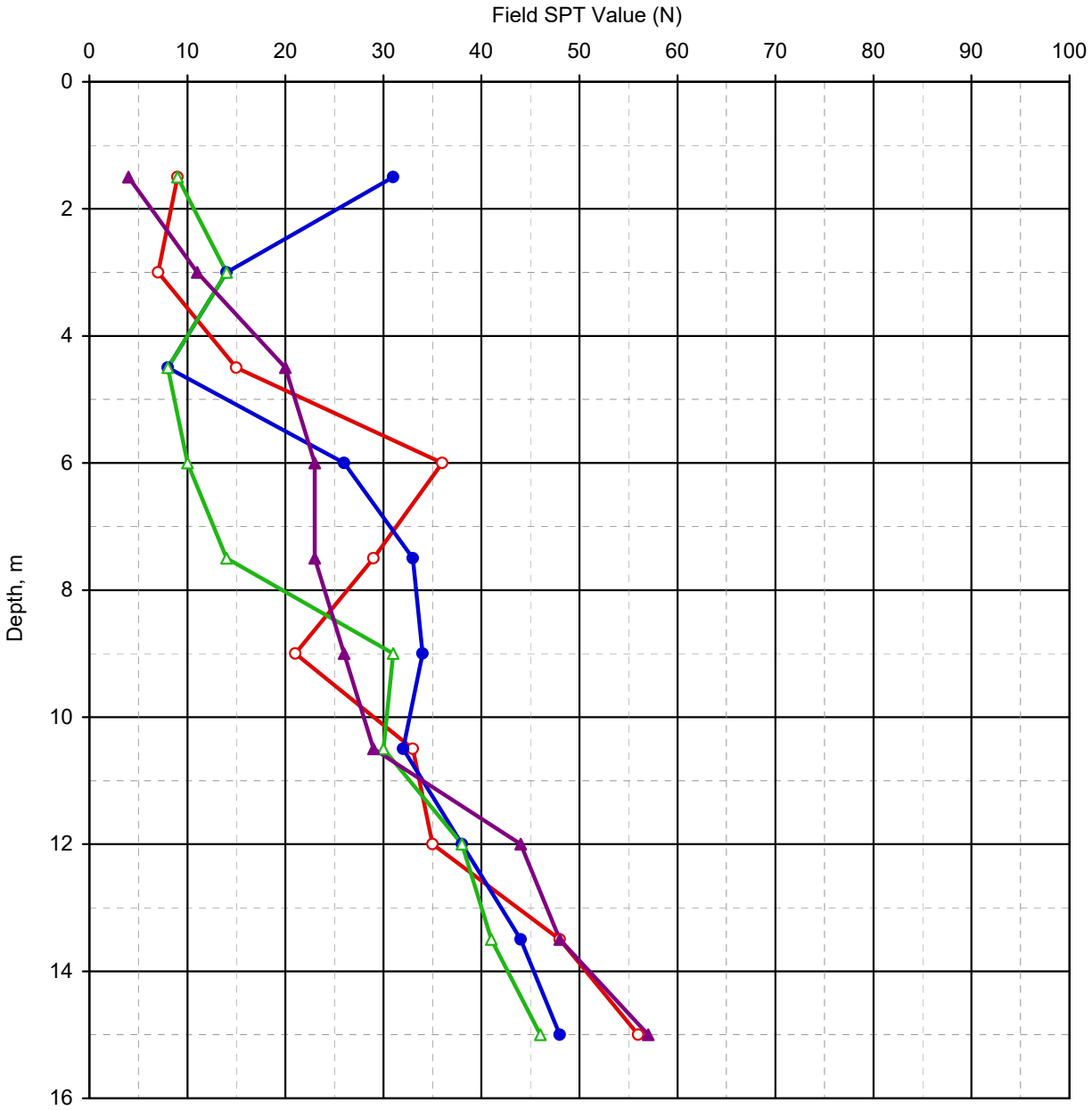
Corrected SPT Values vs. Depth

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details	
Symbol	Borehole Number
○	BH-5
●	BH-6
△	BH-7
▲	BH-8



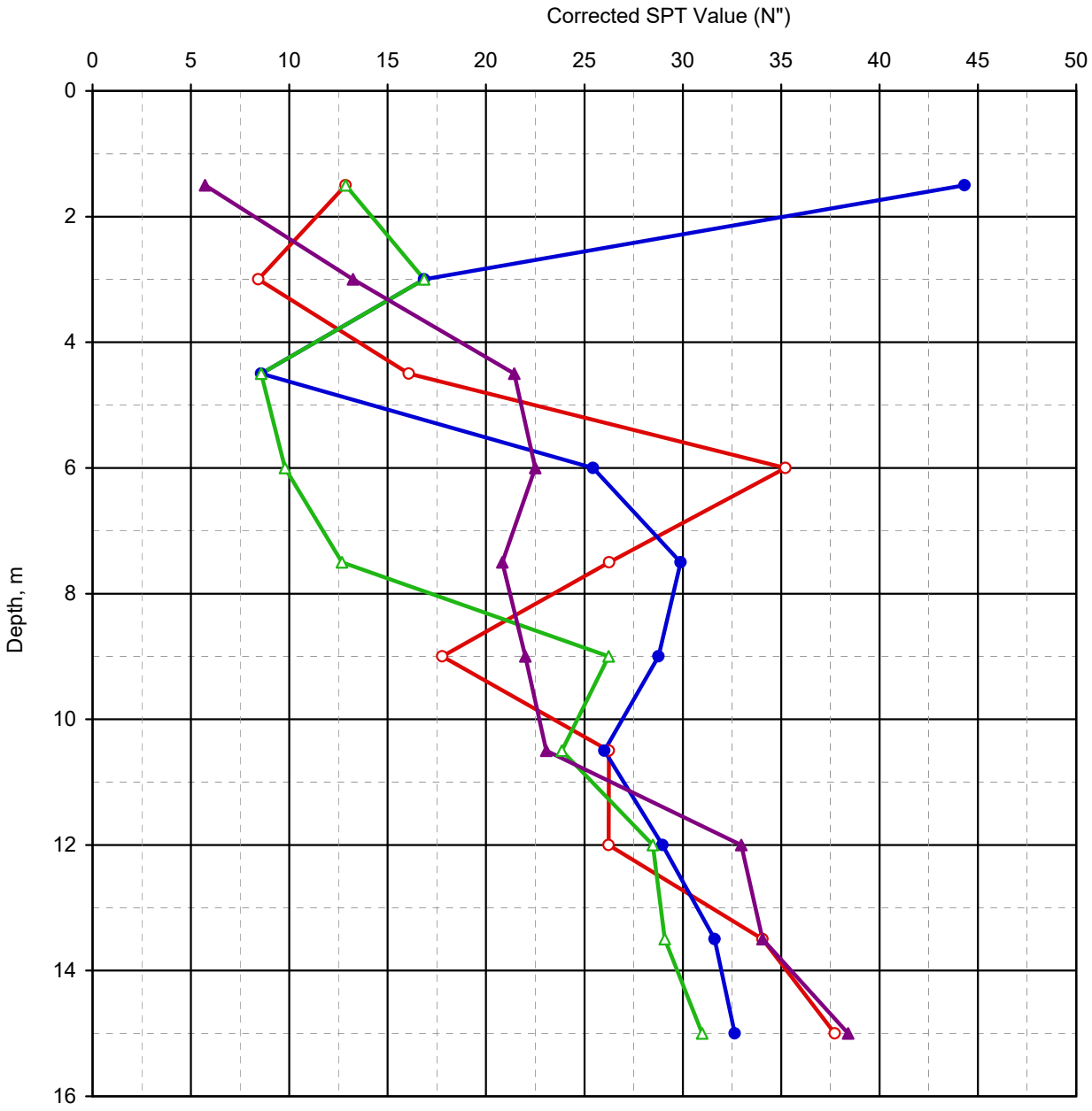
Field SPT Values vs. Depth

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

Standard Penetration Test

IS : 2131-1981, RA-2007

Borehole Details	
Symbol	Borehole Number
	BH-5
	BH-6
	BH-7
	BH-8



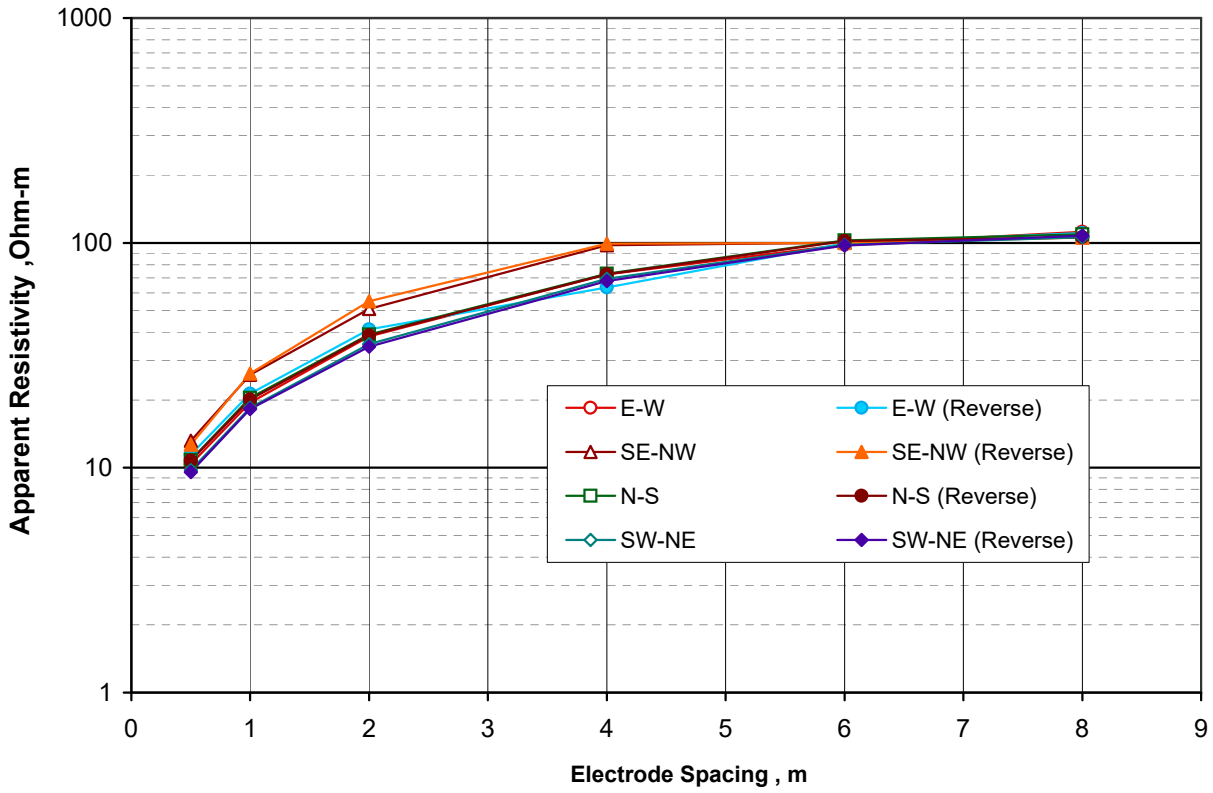
Corrected SPT Values vs. Depth

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

Electrical Resistivity Test No.: ERT-1

IS: 3043-1987, RA-2006

Test Details
Test No. : ERT-1



Electrode Spacing, m	Apparent Resistivity, Ohm-m							
	E-W	E-W (Reverse)	SE-NW	SE-NW (Reverse)	N-S	N-S (Reverse)	SW-NE	SW-NE (Reverse)
0.5	10.4	11.5	13.2	12.7	10.8	10.7	9.7	9.6
1.0	19.5	21.4	25.9	26.3	20.4	20.1	18.5	18.2
2.0	38.3	41.2	50.9	55.0	39.1	38.7	35.4	34.6
4.0	72.4	63.3	97.5	99.3	72.9	72.4	69.1	67.6
6.0	98.4	99.5	100.3	99.9	102.5	101.8	98.0	97.3
8.0	112.1	110.6	106.1	105.6	109.1	106.1	106.1	107.6
	Space Not Available							
Mean Resistivity	59	58	66	66	59	50	56	56

Mean Resistivity Value, ohm-m : 55.7 ohm-m

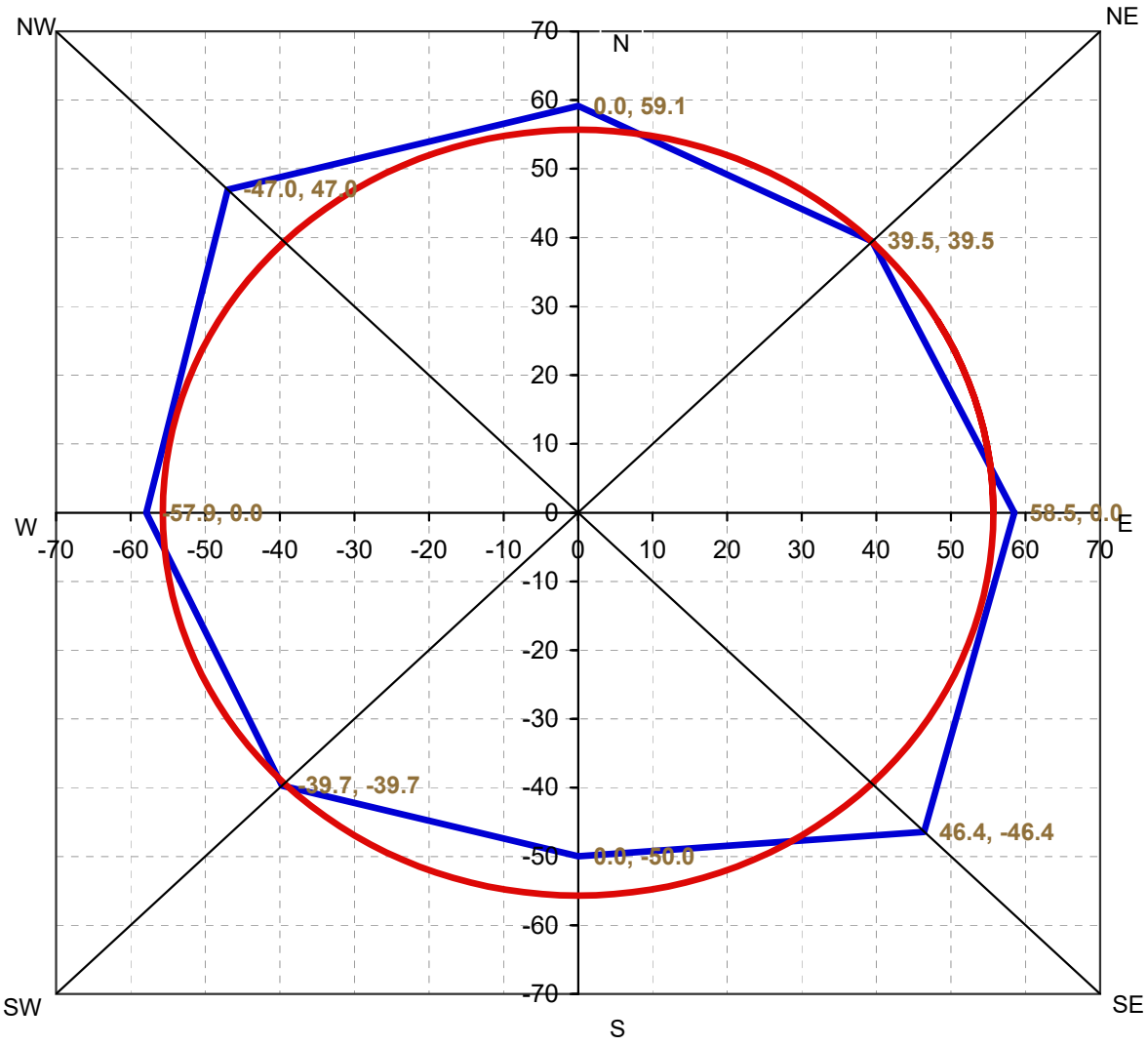
Apparent Resistivity Values & Curves

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.

Electrical Resistivity Test No.: ERT-1

IS: 3043-1987, RA-2006

Test Details
Test No. : ERT-1

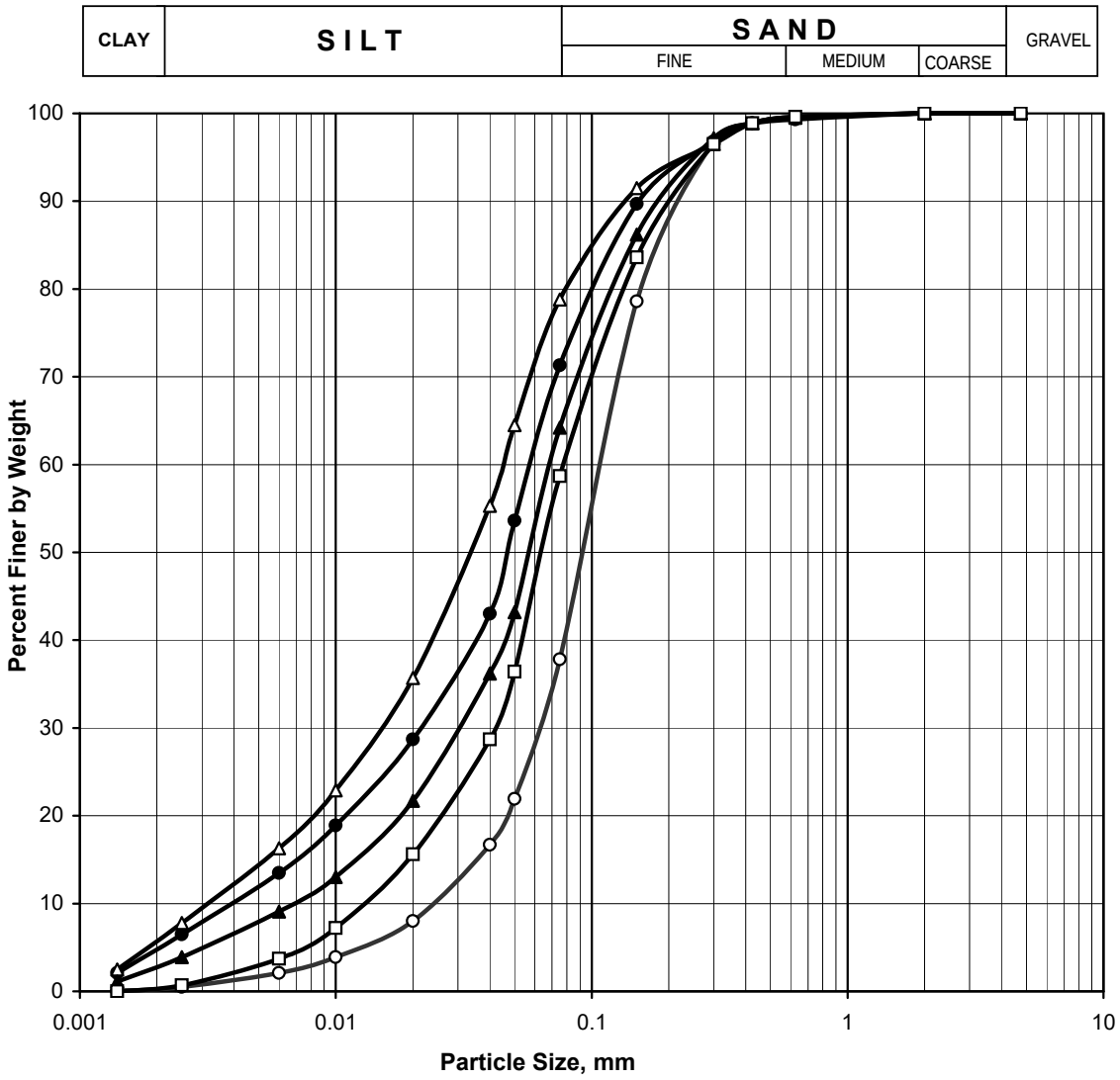


Total Area of Polygon : 9730

Radius of Equivalent Circle=Mean Resistivity : 55.7 ohm-m

Polar Resistivity Curves

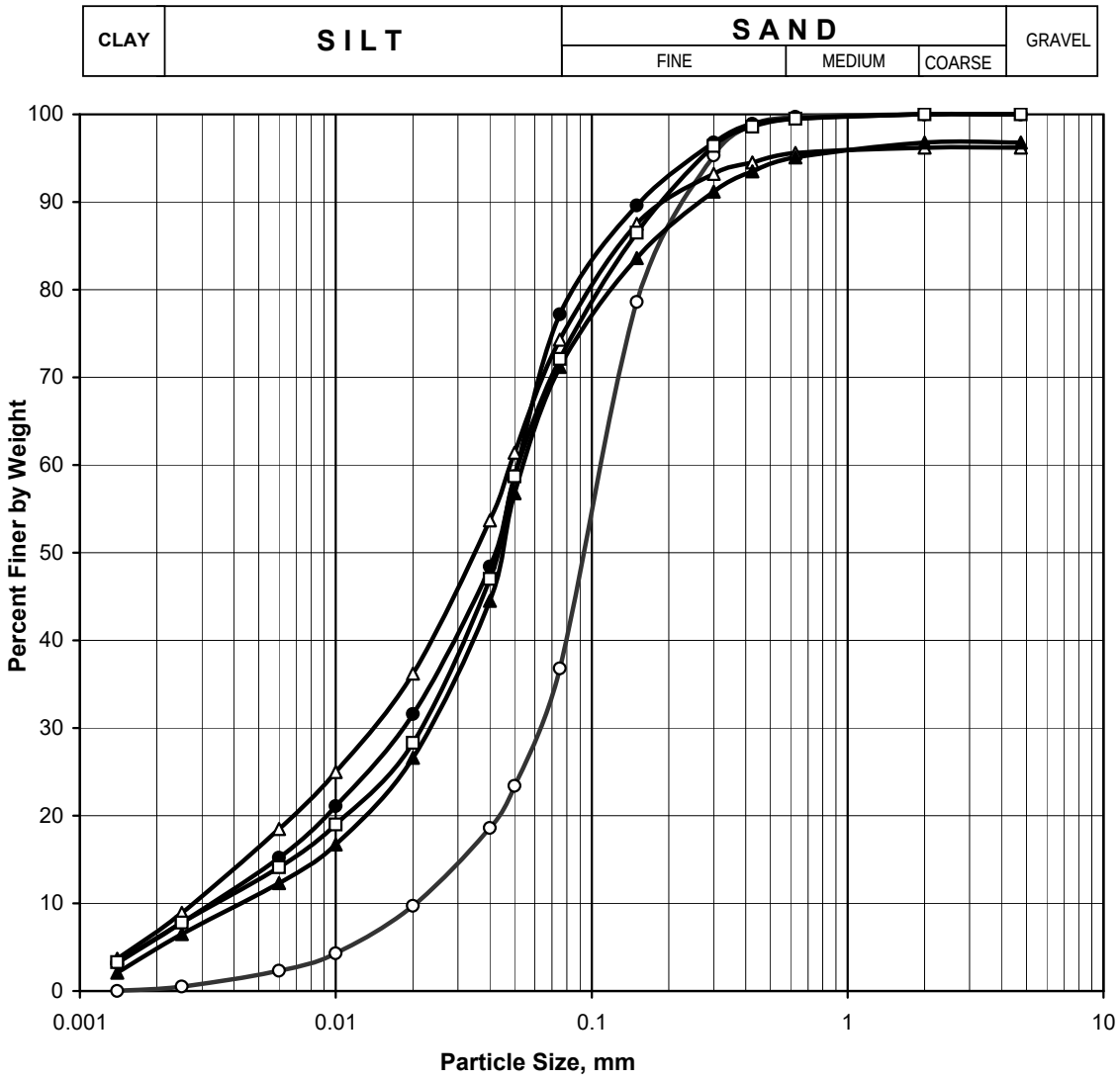
Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



SYMBOL	BH	DEPTH (m)	DESCRIPTION	GRAVEL %	SAND %	SILT %	CLAY %
○	1	2.25	Silty sand **(SM)**	0	62	38	0
●	1	5.25	Sandy silt **(ML-CL)**	0	29	66	5
△	1	8.25	Sandy silt **(ML-CL)**	0	21	73	6
▲	1	10.50	Sandy silt **(ML)**	0	36	61	3
□	1	14.25	Sandy silt **(ML)**	0	41	59	0

Grain Size Analysis

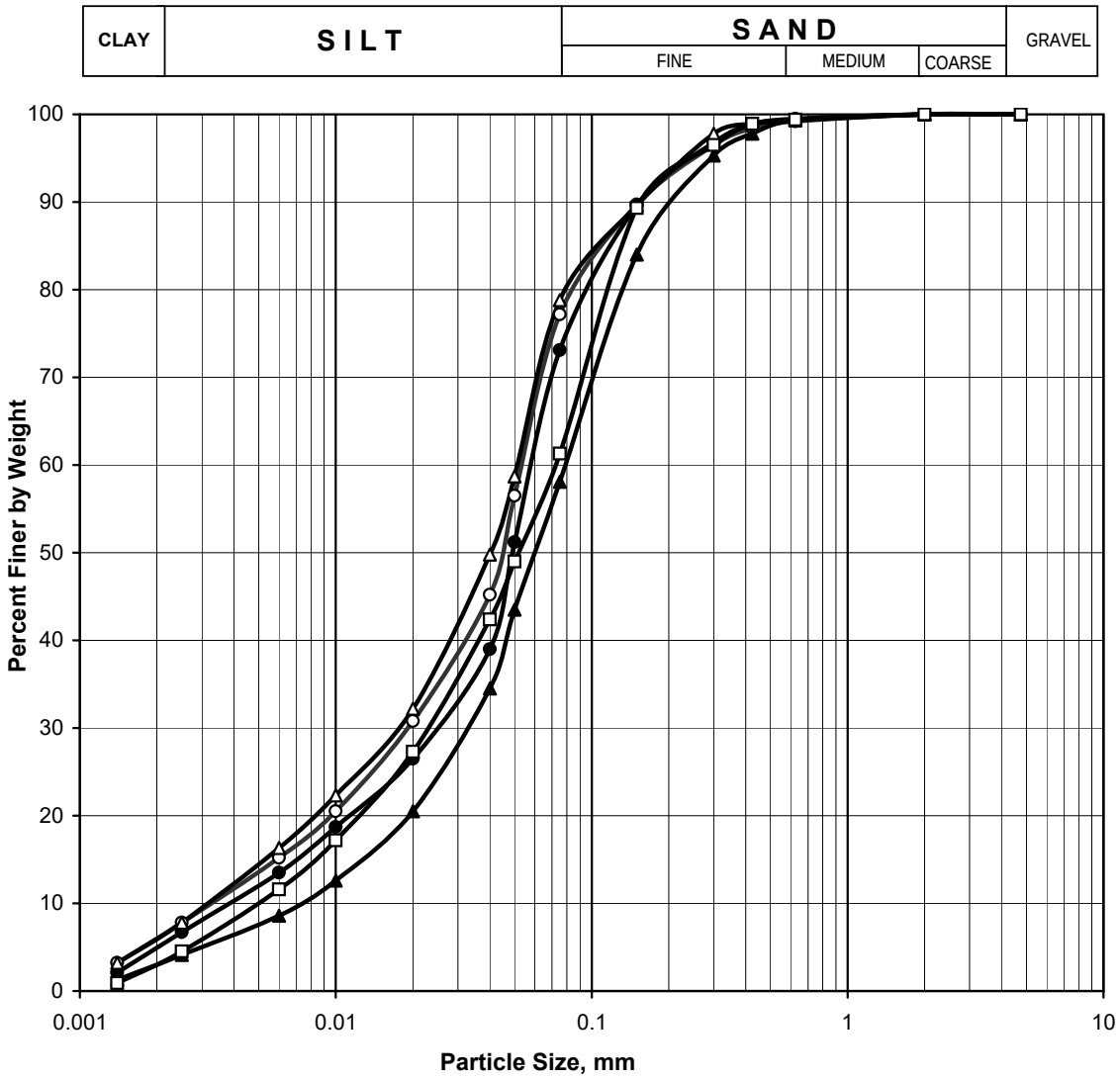
Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



SYMBOL	BH	DEPTH (m)	DESCRIPTION	GRAVEL %	SAND %	SILT %	CLAY %
○	2	3.00	Silty sand **(SM)**	0	63	37	0
●	2	5.25	Sandy silt **(ML-CL)**	0	23	71	6
△	2	8.25	Sandy silt **(ML-CL)**	4	22	67	7
▲	2	11.25	Sandy silt **(ML-CL)**	3	26	66	5
□	2	14.25	Sandy silt **(ML-CL)**	0	28	66	6

Grain Size Analysis

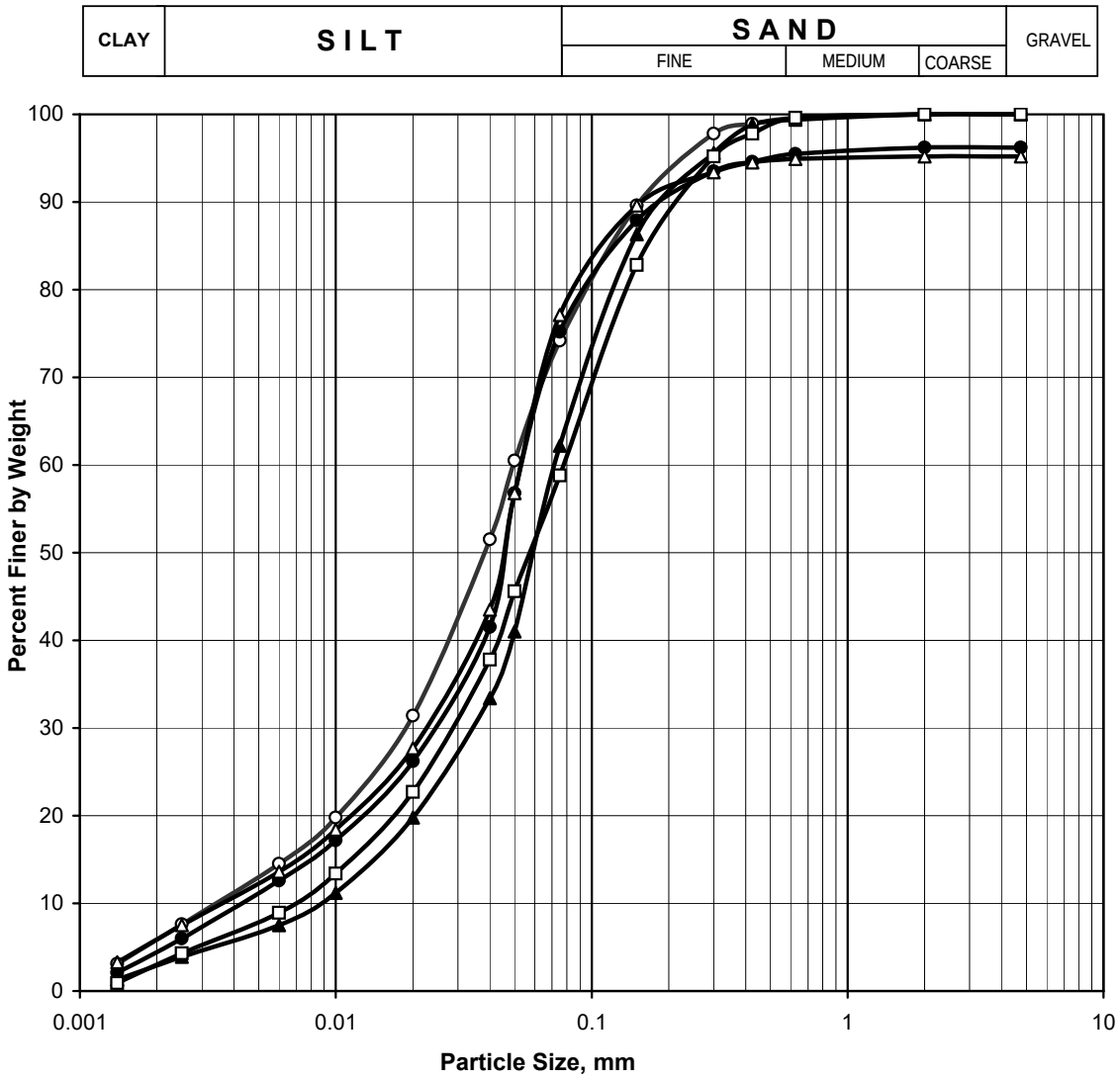
Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



SYMBOL	BH	DEPTH (m)	DESCRIPTION	GRAVEL %	SAND %	SILT %	CLAY %
○	3	4.50	Sandy silt **(ML-CL)**	0	23	71	6
●	3	8.25	Sandy silt **(ML-CL)**	0	27	68	5
△	3	11.25	Sandy silt **(ML-CL)**	0	21	73	6
▲	3	13.50	Sandy silt **(ML)**	0	42	55	3
□	3	15.00	Sandy silt **(ML)**	0	39	58	3

Grain Size Analysis

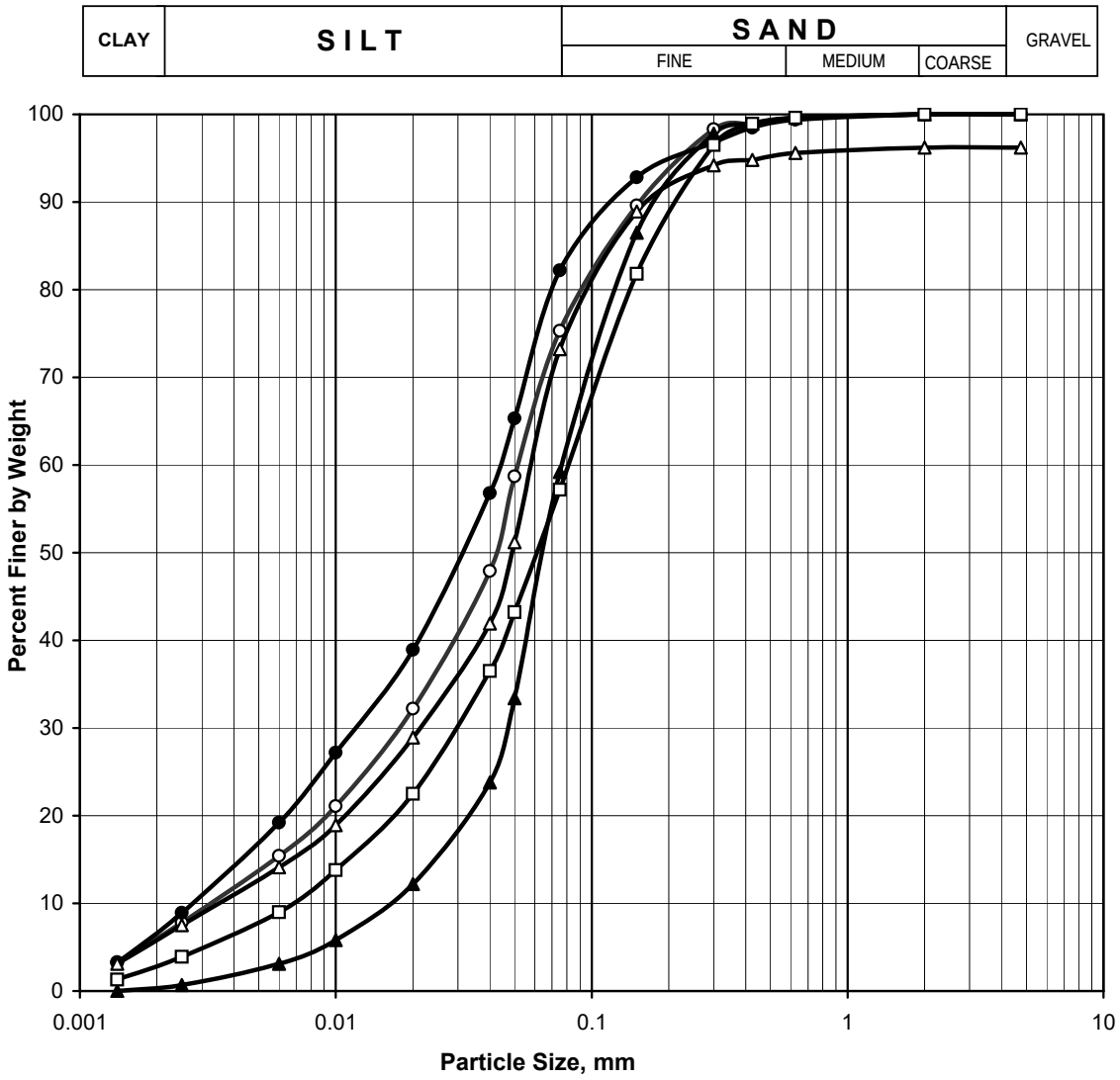
Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



SYMBOL	BH	DEPTH (m)	DESCRIPTION	GRAVEL %	SAND %	SILT %	CLAY %
○	4	3.00	Sandy silt **(ML-CL)**	0	26	68	6
●	4	8.25	Sandy silt **(ML-CL)**	4	21	70	5
△	4	11.25	Sandy silt **(ML-CL)**	5	18	71	6
▲	4	13.50	Sandy silt **(ML)**	0	38	59	3
□	4	15.00	Sandy silt **(ML)**	0	41	56	3

Grain Size Analysis

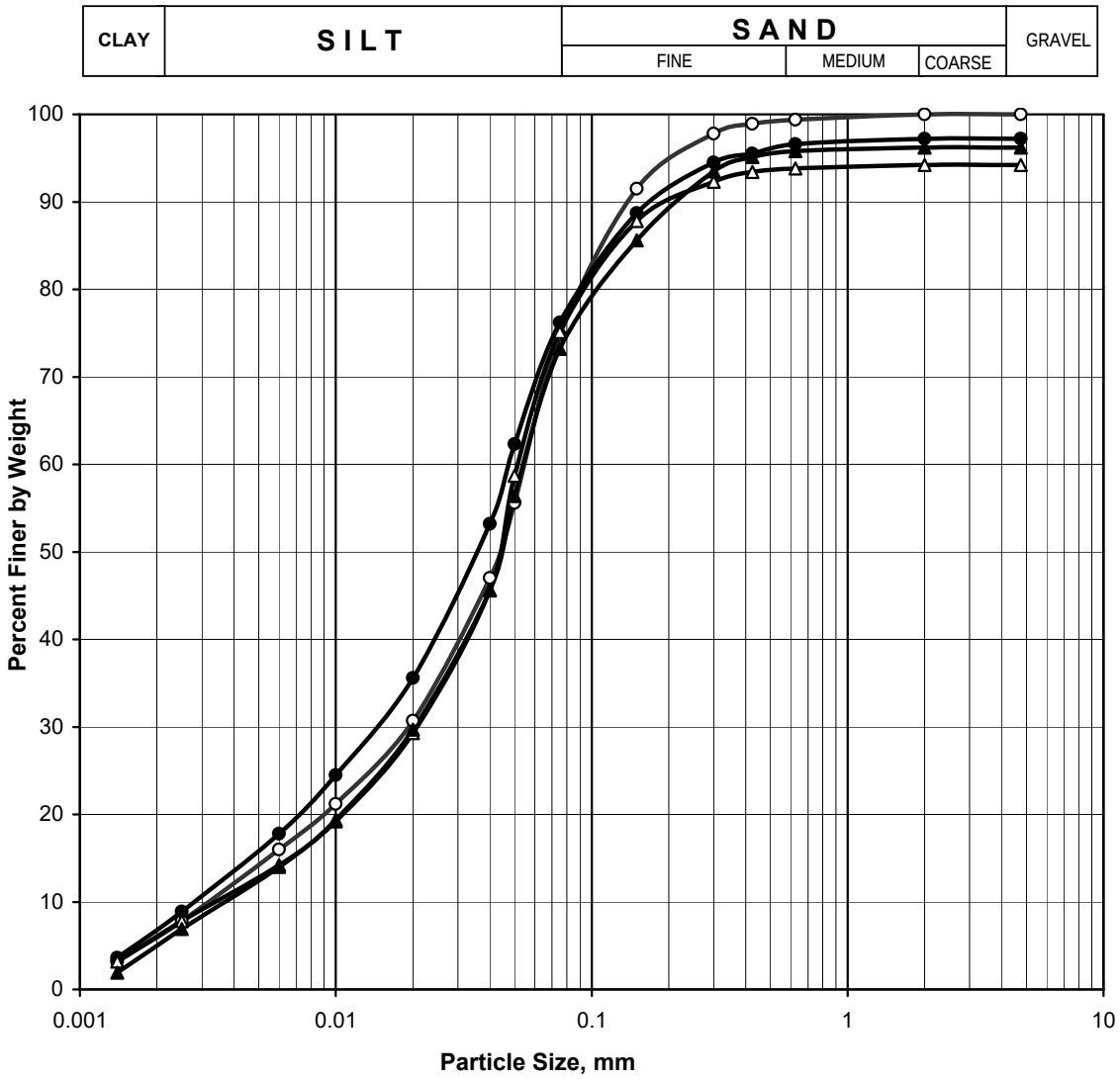
Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



SYMBOL	BH	DEPTH (m)	DESCRIPTION	GRAVEL %	SAND %	SILT %	CLAY %
	5	4.50	Sandy silt **(ML-CL)**	0	25	69	6
	5	8.25	Sandy silt **(ML-CL)**	0	18	75	7
	5	11.25	Sandy silt **(ML-CL)**	4	23	67	6
	5	13.50	Sandy silt **(ML)**	0	41	59	0
	5	15.00	Sandy silt **(ML)**	0	43	54	3

Grain Size Analysis

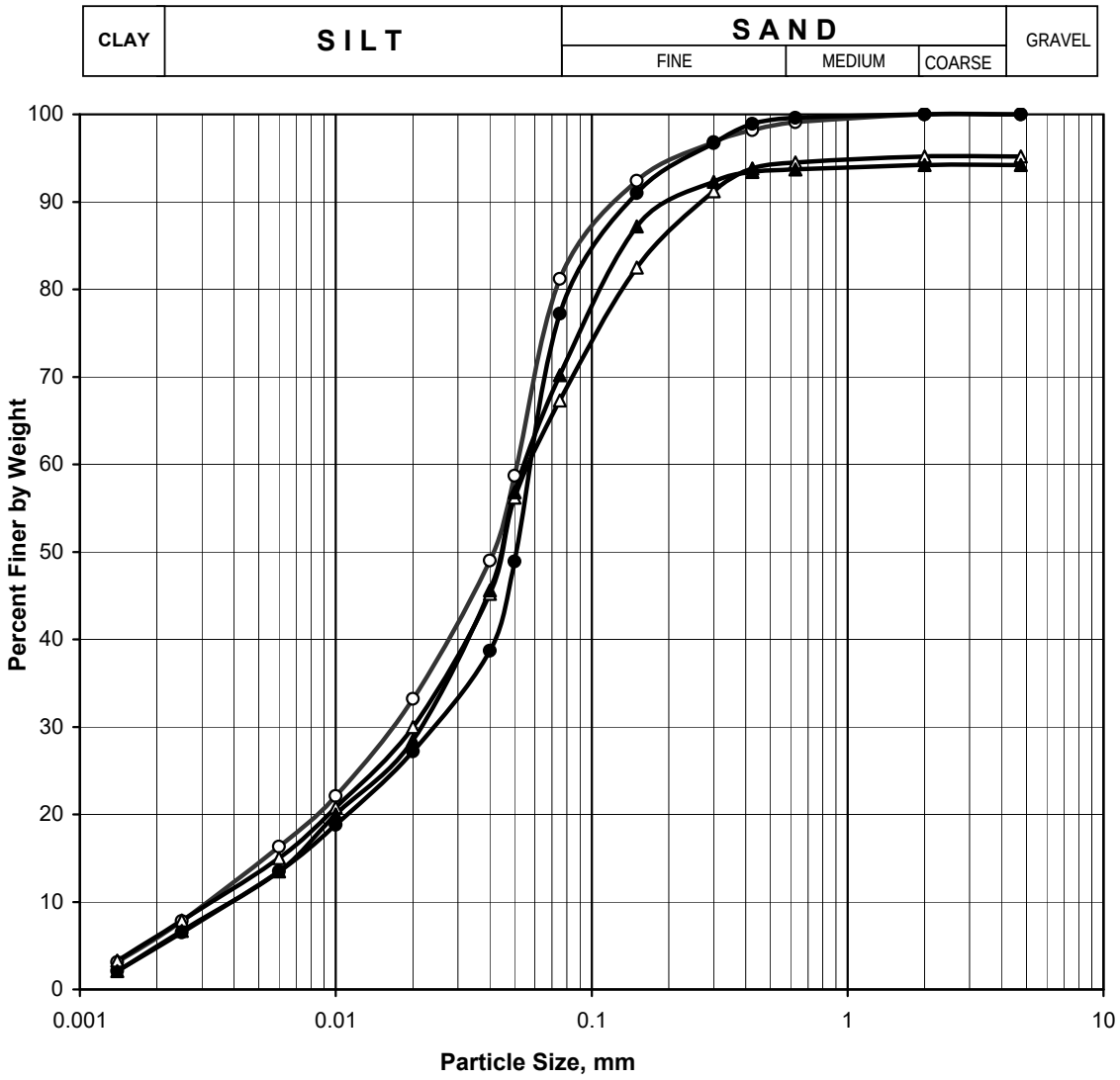
Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



SYMBOL	BH	DEPTH (m)	DESCRIPTION	GRAVEL %	SAND %	SILT %	CLAY %
○	6	5.25	Sandy silt **(ML-CL)**	0	25	69	6
●	6	8.25	Sandy silt **(ML-CL)**	3	21	69	7
△	6	11.25	Sandy silt **(ML-CL)**	6	19	69	6
▲	6	15.00	Sandy silt **(ML-CL)**	4	23	68	5

Grain Size Analysis

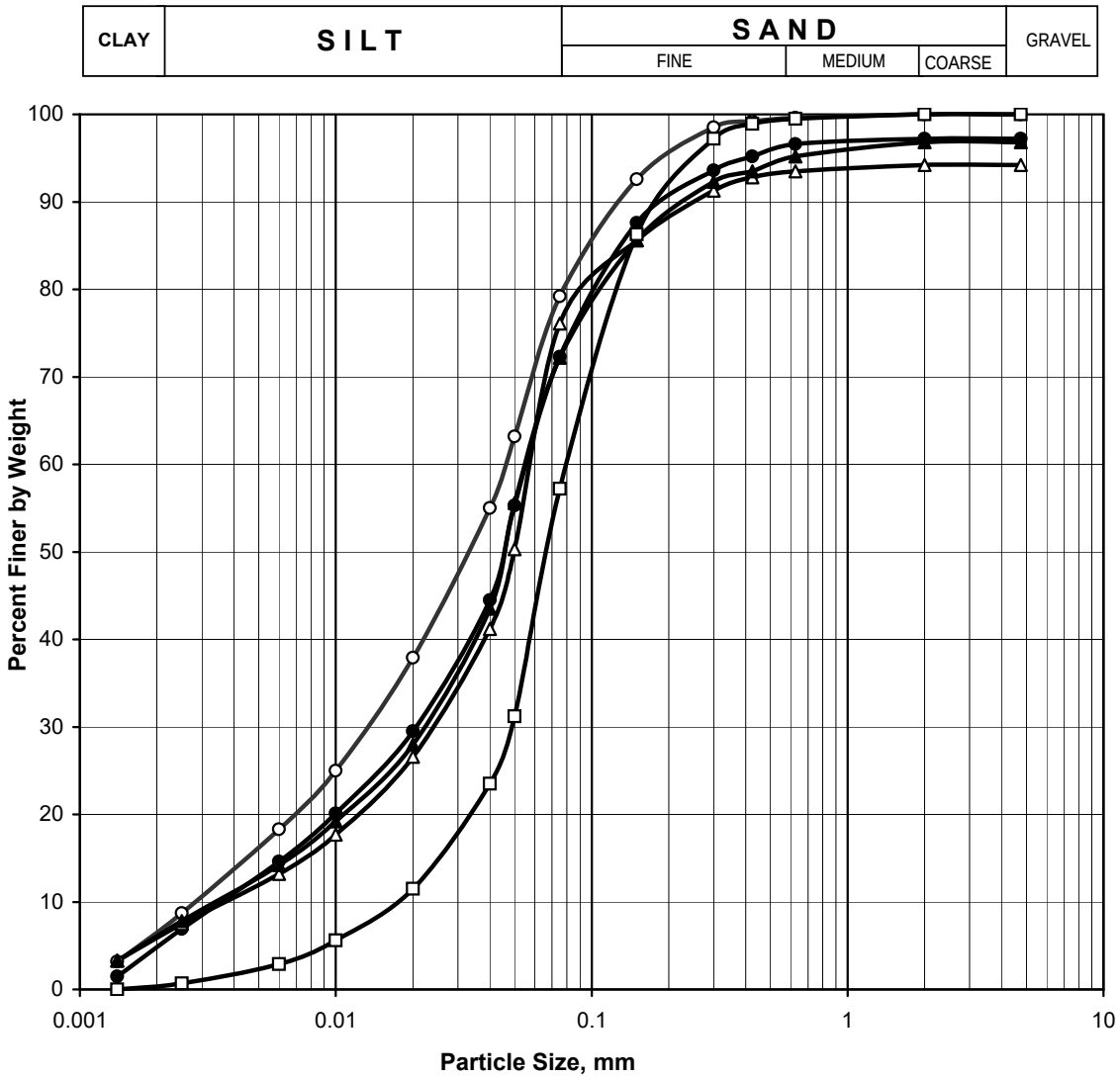
Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



SYMBOL	BH	DEPTH (m)	DESCRIPTION	GRAVEL %	SAND %	SILT %	CLAY %
○	7	5.25	Sandy silt **(ML-CL)**	0	19	75	6
●	7	8.25	Sandy silt **(ML-CL)**	0	23	72	5
△	7	11.25	Sandy silt **(ML-CL)**	5	28	61	6
▲	7	14.25	Sandy silt **(ML-CL)**	6	24	65	5

Grain Size Analysis

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.



SYMBOL	BH	DEPTH (m)	DESCRIPTION	GRAVEL %	SAND %	SILT %	CLAY %
○	8	2.25	Sandy silt **(ML-CL)**	0	21	73	6
●	8	5.25	Sandy silt **(ML-CL)**	3	25	67	5
△	8	8.25	Sandy silt **(ML-CL)**	6	18	70	6
▲	8	11.25	Sandy silt **(ML-CL)**	3	25	66	6
□	8	15.00	Sandy silt **(ML)**	0	43	57	0

Grain Size Analysis

Proposed 66 kV Grid Substation Project at AIIMS, New Delhi.