CHAPTER 9.0

RECOMMENDATION

Based on field investigation, laboratory test results and analysis presented above, net bearing pressure values of shallow footing has been analyzed considering average lowest sub soil parameter of entire bore holes.

The foundation of the proposed structure may be laid at the depth of 1.5 to 2.5 m with size ranging 1.0m to 3.0m depending upon the static load coming on the foundation and other functional requirement. The allowable bearing pressure for varying depth and width is analyzed considering the structural requirement and anticipated load on foundation , although it depends upon the structural consultant to adopt the appropriate depth and width of foundation for the proposed structure.

In view of high water table in pre-monsoon season and anticipated ground water at EGL in monsoon season , it shall be necessary to make pumping out arrangement for execution of foundation concrete.

9.1 ALLOWABLE BEARING PRESSURE:-

The allowable bearing capacity shall be lower of the values as obtained from above two consideration (i.e. shear failure criteria or settlement consideration) as per following table.

PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION AT ALIGARH, UTTAR PRADESH.			
ALLOWABLE BEARING CAPACITY LOWER OF THE TWO CONSIDERATION ,			
DEPTH OF FOOTING Below EGL(m)	**WIDTH OF FOOTING (m)**	**LENGTH OF FOOTING (m)**	**NET ALLOWABLE BEARING CAPACITY (T/M2)**
			SHALLOW FOOTING (T/M2)
1.50	1.00	1.00	8.54
1.50	2.00	2.00	8.20
1.50	3.00	3.00	7.93
2.50	1.00	1.00	13.63
2.50	2.00	2.00	12.07
2.50	3.00	3.00	11.52

9.4 CHEMICAL ANALYSIS OF SOIL AND WATER SAMPLE.

CHEMICAL ANALYSIS OF WATER SAMPLE, PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.											
SL NO	LOCATION (BH No)	DEPTH (M)	ACCEPTING CRITERIA AS PE IS 456-2000.	pH VALUES	ALKALINITY TO NEUTRALISE 100 ML OF WATER	ACIDITY TO NEUTRALISE 100 ML OF WATER	TOTAL SOLIDS IN MG/L	Chloride MG/L	SULPHATE MG/L	TOTAL ORGANIC MATTER IN MG/L	TURBIDITY IN (NTU)
				>6	0-25 ML OF 0.02N H2SO4	0-5 ML OF 0.02 N NaOH	3000 MG/L	500 MG/L	400 MG/L	200 MG/L	
1	BH-2	4.5		7.53	21.0	3.0	1200	210	169	115	3.5
2	BH-7	5		7.10	17.0	4.0	960	285	185	98	4.0
3	BH-11	4		7.05	18.0	2.0	1450	240	165	80	3.0

Remark:- The sub soil water confirms the provision of IS 456-2000.

SOIL CHEMICAL ANALYSIS OF SOIL SAMPLE , PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.					
SL NO	LOCATIONS BH NO	Depth of Sample Below EGL(m)	PERMISSIBLE LIMIT		
			Chloride as CL % by Mass (Volhards Method)	Sulphate as SO4% by Mass (Gravimetric)	pH as Per IS 2720Pt 26
			<0.05%	<0.04%	>6.0
1	BH-1	2.0	0.015	0.015	7.10
2	BH-2	2.5	0.018	0.018	7.40
3	BH-3	3.0	0.020	0.022	6.90
4	BH-4	2.0	0.021	0.013	6.80
5	BH-5	3.0	0.025	0.017	6.50
6	BH-6	1.5	0.015	0.018	7.10
7	BH-7	2.5	0.017	0.012	7.20
8	BH-8	4.0	0.022	0.011	7.40
9	BH-9	2.0	0.024	0.019	7.25
10	BH-10	3.0	0.028	0.014	7.10
11	BH-11	3.5	0.019	0.01	7.60
12	BH-12	5.0	0.014	0.018	6.80
13	BH-13	4.0	0.012	0.02	7.00
14	BH-14	2.0	0.024	0.014	7.35

Remark:- The sub soil samples does not contain aggressive/harmful chemical beyond permissible limit.

ALLIED ENGINEERS JOB NO. M-11/2015-16/1927 SOIL PROFILE	PGCIL	SOIL INVESTIGATION FOR CONST. OF 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.	WATER TABLE 3.80 (M)	LOCATION BH-1	SHEET NO. 1

TYPE OF SAMPLE	DEPTH (m)	SUB SOIL PROFILE	SOIL DESCRIPTION AND CLASSIFICATION	SPT 'N' VALUES(Measured)	SPT 'N' VALUES(Corrected)	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS				HYDROM ANALY	ATTERBERGS' LIMITS				DENSITY gm / cm³		MAX MOISTURE CONTENT (%)	SPECIFIC GRAVITY	FREE SWELLING INDEX (%)	SWELL PRESSURE (Kg/cm2)	SHEARPARAMET UCC,TXL		CONSOLIDATION PARAMETER		STD. PROCTOR TEST MDD GM/CC/OMC %/ CBR%
						GRAVEL	COARSE	MEDIUM	FINE	SILTY+ CLAY %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SHRINKAGE LIMIT	BULK DENSITY	DRY DENSITY					COHESION (C) (KG/CM²)	FRICTION ANGLE (ϕ°)	TYPE	COMPRESSION INDEX	
GL																									
SPT	1.50		Brownish Colour Inorganic Sandy Silt (ML)	4	6	0	0	2	24	74												DST			1.82/10.46/11.55
UDS	2.00					0	1	1	25	73					1.70	1.61	5.91	2.66			0.02	25.5	0.66		
SPT	3.00			4	5	0	0	1	23	76															
SPT	4.50			7	8	0	1	1	25	73												DST			
UDS	5.00					1	1	1	26	71					1.72	1.55	10.64	2.66			0.02	27.5	0.71		
SPT	6.00			15	16	0	1	2	27	70															
SPT	7.50			16	16	0	1	1	65	33												DST			
UDS	8.00					0	1	1	68	30					1.71	1.57	8.74	2.65			0.00	30.5	0.69		
SPT	9.00			18	14	0	1	2	66	31															
SPT	10.50			15	16	0	1	1	69	29												DST			
UDS	11.00		Inorganic Silty Sand (SM)			0	1	2	70	27					1.73	1.57	9.87	2.65			0.00	31.0	0.68		
SPT	12.00			18	16	0	0	2	68	30															
SPT	13.50			20	16	0	1	2	71	26												DST			
UDS	14.00					0	1	2	72	25					1.75	1.58	10.65	2.65			0.00	31.5	0.68		
SPT	15.00			21	16	0	1	2	74	23															
	15.45																								

ALLIED ENGINEERS SOIL PROFILE

JOB NO. M-11/2015-16/1927

PGCIL — **SOIL INVESTIGATION FOR CONST. OF 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.**

WATER TABLE 3.85 (M) | **LOCATION** BH-3 | **SHEET NO.** 3

TYPE OF SAMPLE	DEPTH (m)	SUB SOIL PROFILE	SOIL DESCRIPTION AND CLASSIFICATION	SPT 'N' VALUES(Measured)	SPT 'N' VALUES(Corrected)	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS				HYDROM ANALY	ATTERBERGS' LIMITS				DENSITY gm / cm³		MAX MOISTURE CONTENT (%)	SPECIFIC GRAVITY	FREE SWELLING INDEX (%)	SWELL PRESSURE (Kg/cm2)	SHEARPARAMET UCC,TXL		CONSOLIDATION PARAMETER		STD. PROCTOR TEST MDD GM/CC/OMC %
						GRAVEL	COARSE	MEDIUM	FINE	SILTY+ CLAY %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SHRINKAGE LIMIT	BULK DENSITY	DRY DENSITY					COHESION (C) (KG/CM²)	FRICTION ANGLE (φ°)	Cv	COMPRESSION INDEX	
GL																									
SPT	1.50		Brownish Colour Inorganic Silty Clay (CL)	9	12	0	1	1	2	96											**0.03**	**28.0**	**DST/CUT**		
UDS	**2.00**					0	1	1	1	97	31.85	20.72	11.13		1.82	1.66	9.86	2.67	9	0.016	0.40	12.5	0.61	0.099	
SPT	3.00			12	14	0	2	1	2	95												**TXL/UUT**			
SPT	4.50			12	13	0	1	1	63	35															
UDS	**5.00**					0	1	1	65	33					1.72	1.60	7.56	2.65			0.00	**DST** 30.5	0.66		
SPT	6.00			10	10	0	0	1	67	32															
SPT	7.50			12	12	0	1	2	69	28															
UDS	**8.00**					0	1	1	68	30					1.74	1.59	9.27	2.65			0.00	**DST** 31.5	0.66		
SPT	9.00			18	16	0	0	2	70	28															
SPT	10.50		Inorganic Silty Sand (SM)	20	17	0	1	1	67	31															
UDS	**11.00**					0	0	2	70	28					1.76	1.59	10.81	2.65			0.00	**DST** 32.0	0.67		
SPT	12.00			12	11	0	0	1	65	34															
SPT	13.50			21	17	0	1	1	68	30															
UDS	**14.00**					0	1	2	73	24					1.78	1.60	11.02	2.65			0.00	**DST** 32.5	0.65		
SPT	15.00			21	16	0	1	1	71	27															
	15.45																								

1.85/12.40/9.50

ALLIED ENGINEERS SOIL PROFILE

JOB NO. M-11/2015-16/1927

PGCIL — **SOIL INVESTIGATION FOR CONST. OF 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.**

WATER TABLE 4.00 (M) | **LOCATION** BH-5 | **SHEET NO.** 5

TYPE OF SAMPLE	DEPTH (m)	SUB SOIL PROFILE	SOIL DESCRIPTION AND CLASSIFICATION	SPT 'N' VALUES(Measured)	SPT 'N' VALUES(Corrected)	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS				HYDROM ANALY	ATTERBERGS' LIMITS				DENSITY gm/cm		MAX MOISTURE CONTENT (%)	SPECIFIC GRAVITY	FREE SWELLING INDEX (%)	SWELL PRESSURE (Kg/cm2)	SHEARPARAMETUCC,TXL		CONSOLIDATION PARAMETER		STD. PROCTOR TEST MDD GM/CC/OMC %
						GRAVEL	COARSE	MEDIUM	FINE	SILTY+ CLAY %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SHRINKAGE LIMIT	BULK DENSITY	DRY DENSITY					COHESION (C) (KG/CM²)	FRICTION ANGLE (Ø°)	Ø	COMPRESSION INDEX	
GL																									
SPT	1.50			4	6	0	0	2	63	35															
UDS	**2.00**					0	1	1	65	33					1.63	1.55	5.11	2.65			0.00	DST 28.0	0.71		
SPT	3.00			7	8	0	1	2	67	30															
SPT	4.50			14	15	0	0	2	70	28															
UDS	**5.00**					0	1	2	67	30					1.69	1.58	6.99	2.65			0.00	DST 29.5	0.68		
SPT	6.00		Inorganic Silty Sand (SM)	14	15	0	0	1	66	33															
SPT	7.50			9	9	0	1	1	68	30															
UDS	**8.00**					0	1	2	69	28					1.71	1.58	7.98	2.65			0.00	DST 30.0	0.67		
SPT	9.00			10	10	0	0	2	66	32															
SPT	10.50			12	11	0	1	1	69	29															
UDS	**11.00**					0	1	1	68	30					1.73	1.58	9.84	2.65			0.00	DST 30.5	0.68		
SPT	12.00			12	11	0	1	2	70	27															
SPT	13.50			14	12	0	1	1	67	31															
UDS	**14.00**					0	1	2	71	26					1.76	1.60	10.27	2.65			0.00	DST 31.5	0.66		
SPT	15.00			16	14	0	0	2	65	33															
	15.45																								1.79/9.40/12.50

ALLIED ENGINEERS — SOIL PROFILE

JOB NO. M-11/2015-16/1927

PGCIL — SOIL INVESTIGATION FOR CONST. OF 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.

WATER TABLE 3.50 (M) | **LOCATION** BH-7 | **SHEET NO.** 7

TYPE OF SAMPLE	DEPTH (m)	SUB SOIL PROFILE	SOIL DESCRIPTION AND CLASSIFICATION	SPT 'N' VALUES(Measured)	SPT 'N' VALUES(Corrected)	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS GRAVEL	COARSE	MEDIUM	FINE	HYDROM ANALY SILTY+ CLAY %	ATTERBERGS' LIMITS LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SHRINKAGE LIMIT	DENSITY gm/cm BULK DENSITY	DRY DENSITY	MAX MOISTURE CONTENT (%)	SPECIFIC GRAVITY	FREE SWELLING INDEX (%)	SWELL PRESSURE (Kg/cm2)	SHEARPARAMET UCC,TXL COHESION (C) (KG/CM²)	FRICTION ANGLE (ϕ°)	CONSOLIDATION PARAMETER TO AND	COMPRESSION INDEX	STD. PROCTOR TEST MDD GM/CC/OMC %
GL																									
SPT	1.50		Brownish Colour Inorganic Silty Clay (CL)	9	12	0	1	1	2	96											0.02	26.5	DST/CUT			
UDS	2.00					1	1	1	2	95	30.24	20.17	10.07		1.81	1.66	9.23	2.67	8	0.013	0.35	10.5	0.61	0.095	1.84/13.70/8.20
SPT	3.00			10	12	0	1	1	1	97												TXL/UUT			
SPT	4.50			9	10	0	1	1	66	32															
UDS	5.00					0	1	1	67	31					1.68	1.56	7.36	2.65			0.00	DST 29.0	0.69		
SPT	6.00			12	13	0	0	2	65	33															
SPT	7.50		Inorganic Silty Sand (SM)	14	14	0	1	1	70	28												DST			
UDS	8.00					0	1	2	69	28					1.70	1.56	9.16	2.65			0.00	30.0	0.70		
SPT	9.00			13	13	0	0	2	67	31															
SPT	10.50			17	15	0	1	2	72	25												DST			
UDS	11.00					0	1	1	68	30					1.73	1.57	10.11	2.65			0.00	31.0	0.69		
SPT	12.00			17	15	0	1	2	71	26															
SPT	13.50			21	17	0	2	2	24	72												DST			
UDS	14.00		Brownish Colour Inorganic Sandy Silt (ML)			2	1	2	25	70					1.84	1.63	12.64	2.66			0.02	29.5	0.63		
SPT	15.00			21	16	0	1	1	24	74															
	15.45																								

ALLIED ENGINEERS JOB NO. M-11/2015-16/1927 SOIL PROFILE	PGCIL	SOIL INVESTIGATION FOR CONST. OF 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.	WATER TABLE 2.70 (M)	LOCATION BH-9	SHEET NO. 9

TYPE OF SAMPLE	DEPTH (m)	SUB SOIL PROFILE	SOIL DESCRIPTION AND CLASSIFICATION	SPT 'N' VALUES(Measured)	SPT 'N' VALUES(Corrected)	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS				HYDROM ANALY	ATTERBERGS' LIMITS				DENSITY gm/cm		MAX MOISTURE CONTENT (%)	SPECIFIC GRAVITY	FREE SWELLING INDEX (%)	SWELL PRESSURE (Kg/cm2)	SHEARPARAMET UCC,TXL		CONSOLIDATION PARAMETER		STD. PROCTOR TEST MDD GM/CC/OMC %
						GRAVEL	COARSE	MEDIUM	FINE	SILTY+ CLAY %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SHRINKAGE LIMIT	BULK DENSITY	DRY DENSITY					COHESION (C) (KG/CM²)	FRICTION ANGLE (Ø°)	TO AND	COMPRESSION INDEX	
GL																									
SPT	1.50			9	13	0	0	2	67	31												DST			
UDS	**2.00**					0	0	1	65	34					1.63	1.55	5.13	2.65			0.00	28.0	0.71		
SPT	3.00			6	8	0	1	1	64	36															
SPT	4.50			10	12	0	1	2	68	29												DST			
UDS	**5.00**		Inorganic Silty Sand (SM)			0	1	1	67	31					1.65	1.54	7.45	2.65			0.00	28.5	0.73		
SPT	6.00			16	17	0	1	1	70	28															
SPT	7.50			19	18	0	2	2	72	24												DST			
UDS	**8.00**					0	1	2	70	27					1.70	1.55	9.82	2.65			0.00	30.0	0.71		
SPT	9.00			23	19	0	1	1	71	27															
SPT	10.50			14	14	0	2	2	65	31												DST			
UDS	**11.00**					0	1	1	69	29					1.73	1.57	10.17	2.65			0.00	31.0	0.69		
SPT	12.00			21	17	0	1	2	73	24															
SPT	13.50		Brownish Colour Inorganic Silty Clay (CL)	36	24	1	2	1	2	94											0.04	29.0	DST/CUT		
UDS	**14.00**					1	1	1	1	96	31.22	20.22	11.00		1.88	1.64	14.85	2.67	9	0.016	0.58	5.0	0.63	0.081	
SPT	15.00			30	21	0	2	1	2	95												TXL/UUT			
	15.45																								

ALLIED ENGINEERS JOB NO. M-11/2015-16/1927	SOIL PROFILE	PGCIL	SOIL INVESTIGATION FOR CONST. OF 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.	WATER TABLE 3.50 (M)	LOCATION BH-11	SHEET NO. 11

TYPE OF SAMPLE	DEPTH (m)	SUB SOIL PROFILE	SOIL DESCRIPTION AND CLASSIFICATION	SPT 'N' VALUES(Measured)	SPT 'N' VALUES(Corrected)	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS: GRAVEL	COARSE	MEDIUM	FINE	HYDROM ANALY: SILTY+ CLAY %	ATTERBERGS' LIMITS: LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SHRINKAGE LIMIT	DENSITY gm / cm³: BULK DENSITY	DRY DENSITY	MAX MOISTURE CONTENT (%)	SPECIFIC GRAVITY	FREE SWELLING INDEX (%)	SWELL PRESSURE (Kg/cm2)	SHEARPARAMET UCC,TXL: COHESION (C) (KG/CM²)	FRICTION ANGLE (Ø)	CONSOLIDATION PARAMETER: ATD	COMPRESSION INDEX	STD. PROCTOR TEST MDD GM/CC/OMC %
GL																									
SPT	1.50			6	8	0	1	1	68	30															1.77/9.60/13.70
UDS	**2.00**					0	1	2	65	32					1.61	1.53	4.99	2.65			0.00	**DST** 28.0	0.73		
SPT	3.00			6	7	0	1	1	70	28															
SPT	4.50			11	13	0	1	2	72	25															
UDS	**5.00**		Inorganic Silty Sand (SM)			0	1	1	68	30					1.70	1.58	7.51	2.65			0.00	**DST** 30.0	0.68		
SPT	6.00			17	17	0	1	2	71	26															
SPT	7.50			13	13	0	0	2	73	25															
UDS	**8.00**					0	1	2	69	28					1.72	1.57	9.74	2.65			0.00	**DST** 30.5	0.69		
SPT	9.00			17	16	0	1	1	70	28															
SPT	10.50			15	14	0	2	2	72	24															
UDS	**11.00**					0	1	1	71	27					1.74	1.58	10.46	2.65			0.00	**DST** 31.5	0.68		
SPT	12.00			14	13	0	0	2	74	24															
SPT	13.50			18	15	0	2	1	2	95											**0.04**	**29.5**	**DST/CUT**		
UDS	**14.00**		Brownish Colour Inorganic Silty Clay (CL)			2	1	2	2	93	31.00	20.00	11.00		1.89	1.64	14.96	2.67	12	0.028	0.60	5.5 **TXL/UUT**	0.62	0.080	
SPT	15.00			22	17	1	1	1	2	95															
	15.45																								

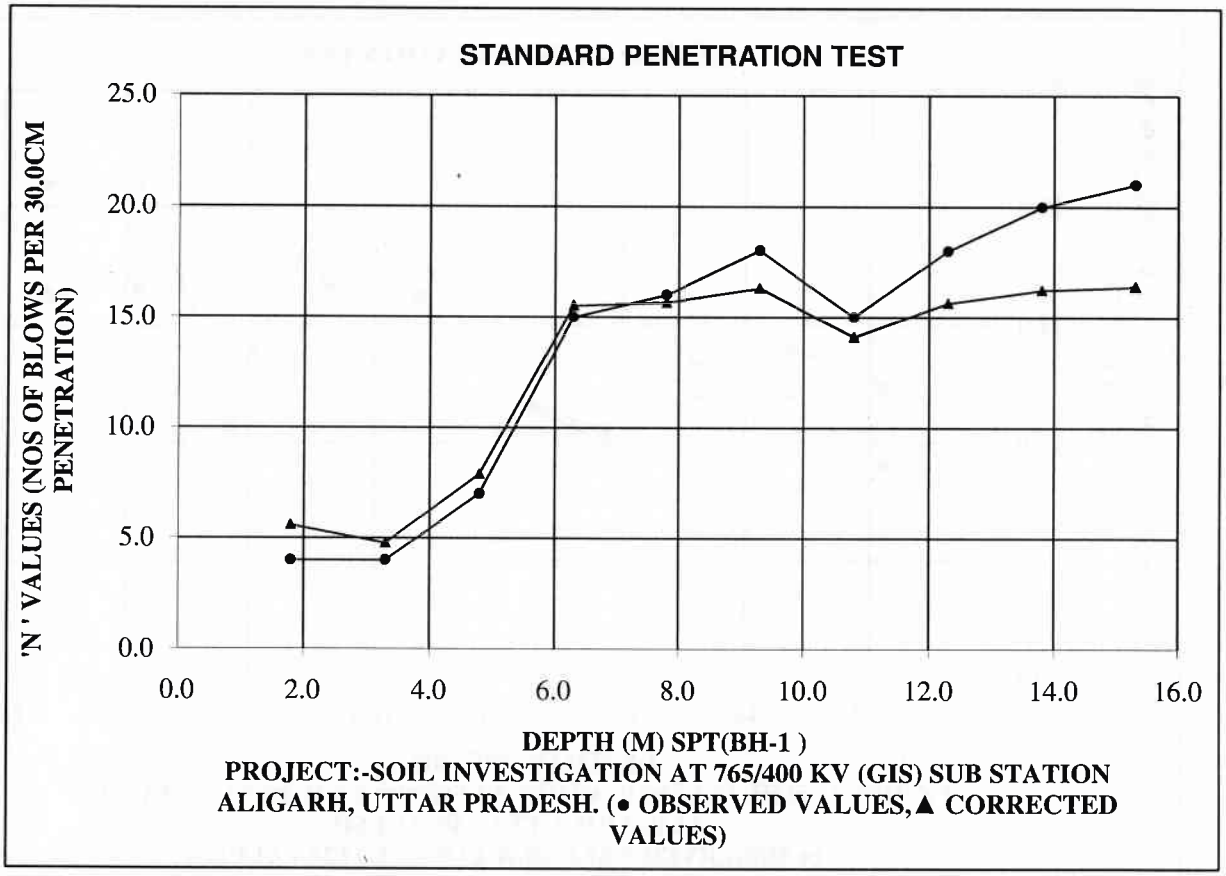
ALLIED ENGINEERS — **SOIL PROFILE**

JOB NO. M-11/2015-16/1927

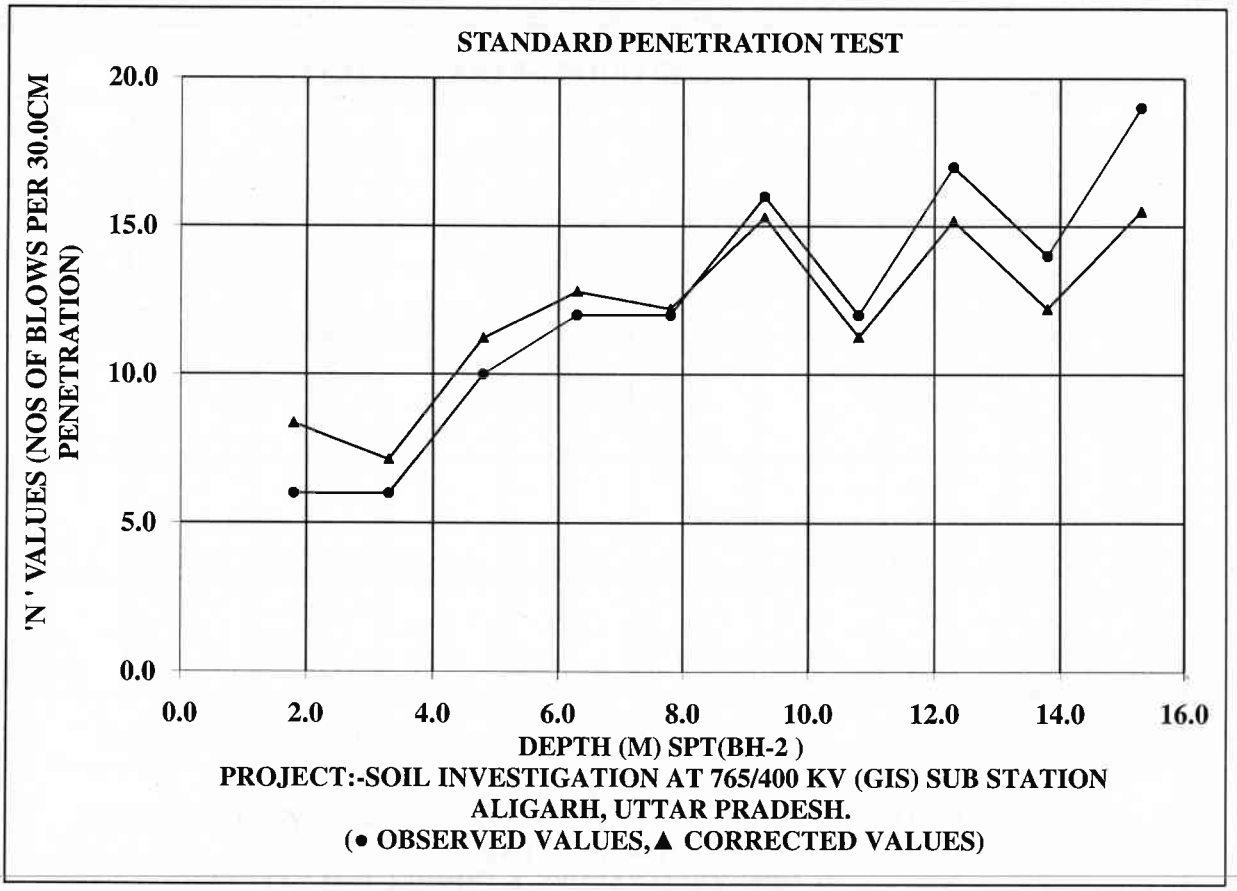
PGCIL — **SOIL INVESTIGATION FOR CONST. OF 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.**

WATER TABLE 2.50 (M) | **LOCATION BH-13** | **SHEET NO. 13**

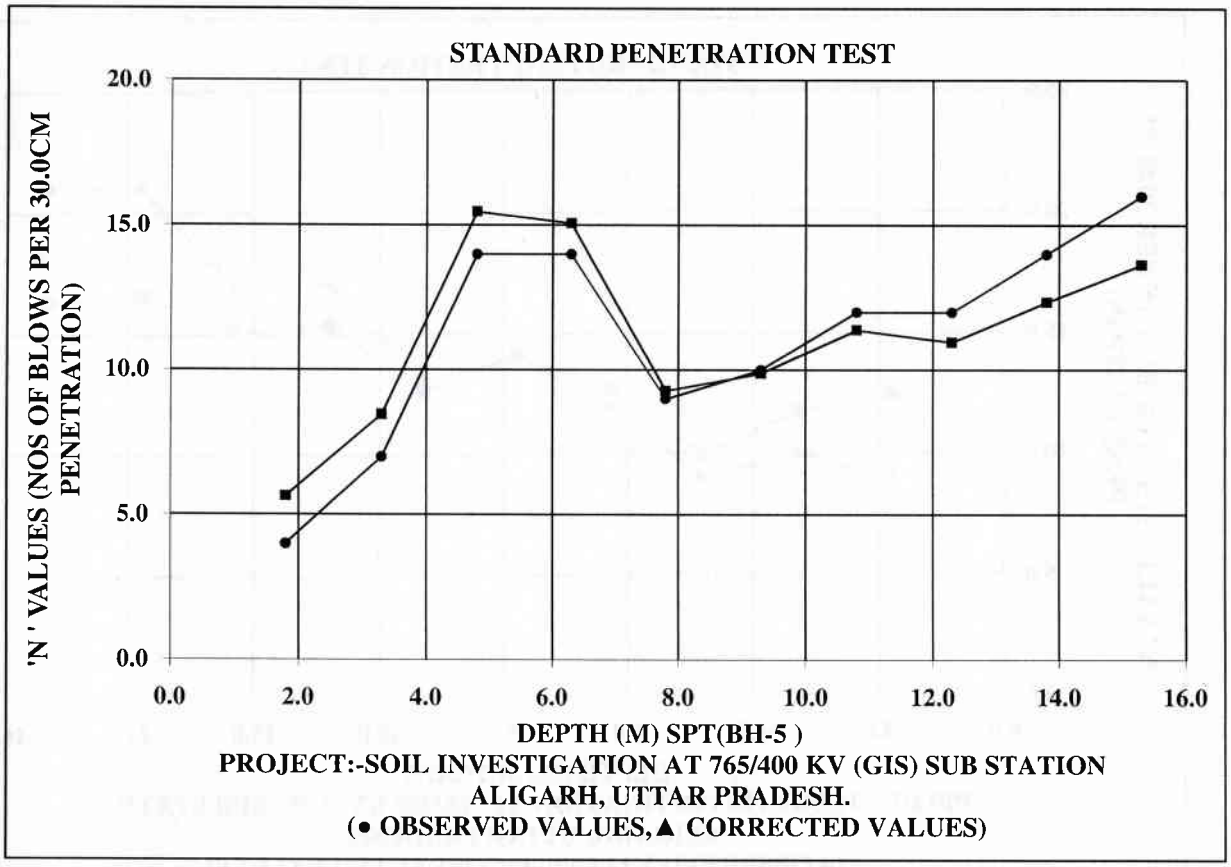
TYPE OF SAMPLE	DEPTH (m)	SUB SOIL PROFILE	SOIL DESCRIPTION AND CLASSIFICATION	SPT 'N' VALUES(Measured)	SPT 'N' VALUES(Corrected)	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS				HYDROM ANALY	ATTERBERGS' LIMITS				DENSITY gm / cm³		MAX MOISTURE CONTENT (%)	SPECIFIC GRAVITY	FREE SWELLING INDEX (%)	SWELL PRESSURE (Kg/cm2)	SHEARPARAMET UCC,TXL		CONSOLIDATION PARAMETER		STD. PROCTOR TEST MDD GM/CC/OMC %
						GRAVEL	COARSE	MEDIUM	FINE	SILTY+ CLAY %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SHRINKAGE LIMIT	BULK DENSITY	DRY DENSITY					COHESION (C) (KG/CM²)	FRICTION ANGLE (Ø°)	TO AND	COMPRESSION INDEX	
GL																									
SPT	1.50		Brownish Colour Inorganic Sandy Silt (ML)	2	3	0	0	1	23	76															
UDS	**2.00**					0	1	1	24	74					1.70	1.61	5.41	2.66			0.02	**DST** 25.0	0.65		
SPT	3.00			7	9	0	0	2	26	72															
SPT	4.50		Inorganic Silty Clay (CL)	9	11	0	0	1	2	97											**0.02**	**26.5**	**DST/CUT**		
UDS	**5.00**					1	1	1	1	96	31.10	20.79	10.31		1.72	1.53	12.65	2.67			0.35	7.0	0.75	0.090	
SPT	6.00			10	11	0	0	2	67	31												**TXL/UUT**			
SPT	7.50			12	13	0	1	2	70	27															
UDS	**8.00**					0	1	1	65	33					1.70	1.55	9.68	2.65			0.00	**DST** 30.0	0.71		
SPT	9.00		Inorganic Silty Sand (SM)	13	13	0	1	2	72	25															
SPT	10.50			14	14	0	1	2	70	27															
UDS	**11.00**					0	1	1	70	28					1.72	1.56	10.21	2.65			0.00	**DST** 30.5	0.70		
SPT	12.00			18	16	0	1	2	73	24															
SPT	13.50			22	17	0	1	1	70	28															
UDS	**14.00**					0	1	2	72	25					1.74	1.57	10.69	2.65			0.00	**DST** 31.0	0.69		
SPT	15.00			22	17	0	1	2	70	27															
	15.45																								

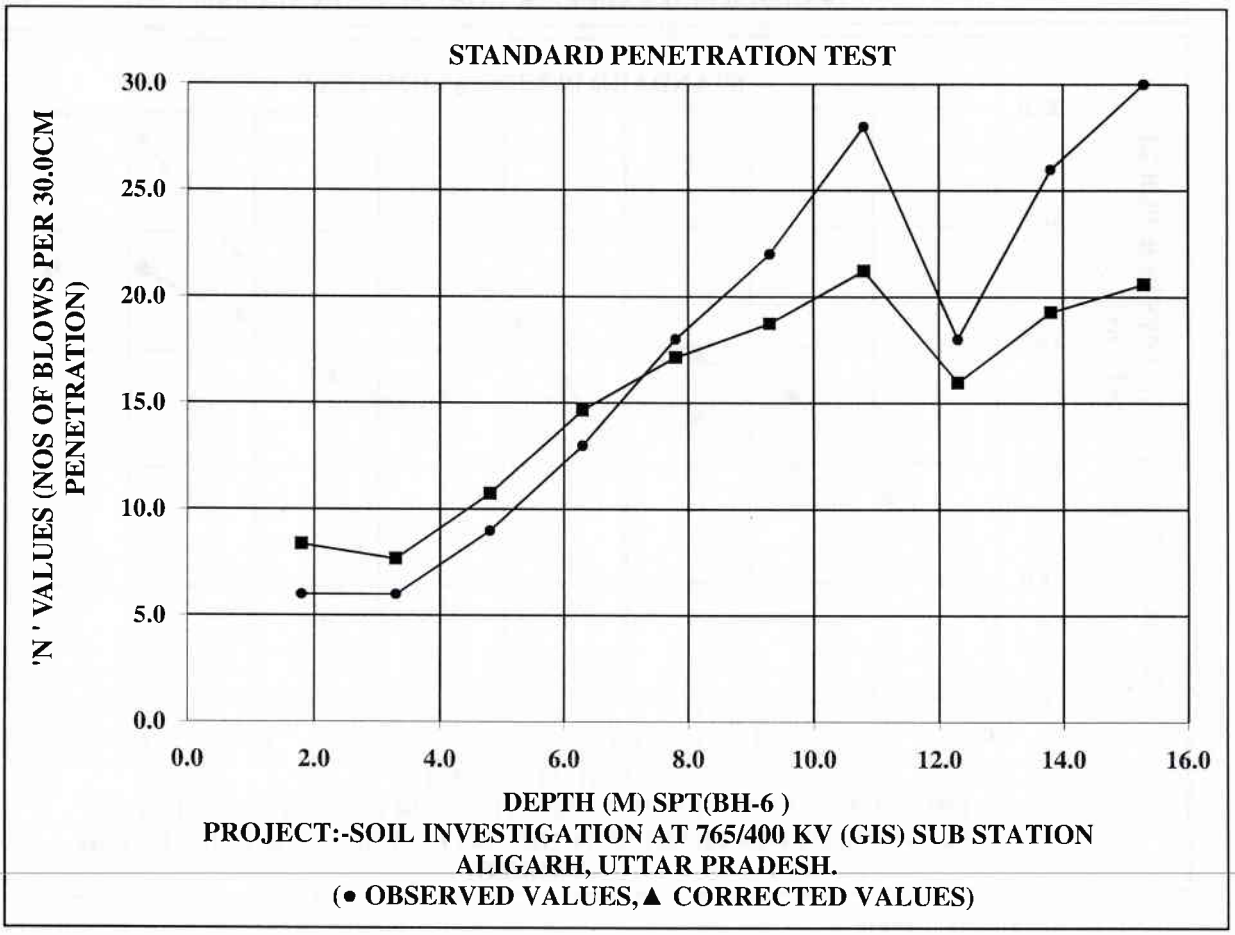


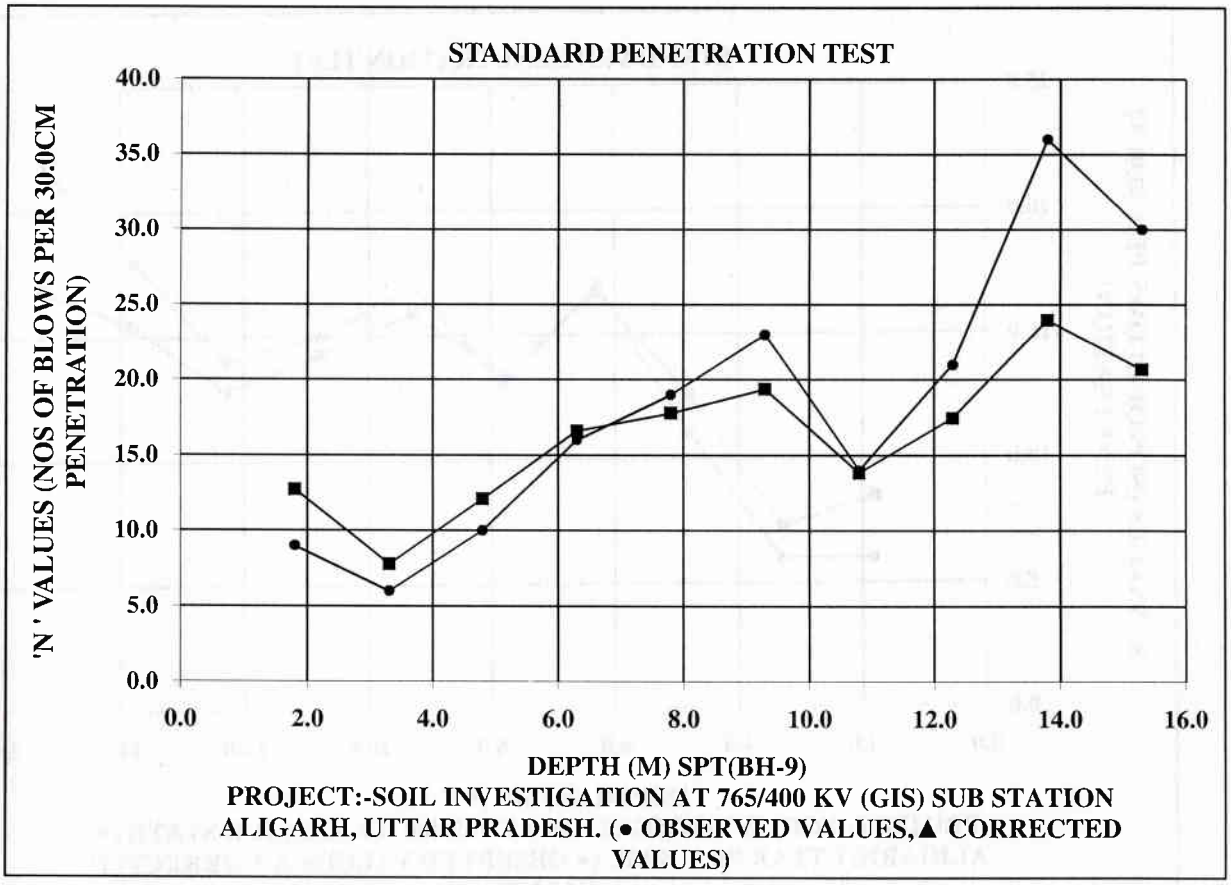
PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH. (● OBSERVED VALUES,▲ CORRECTED VALUES)



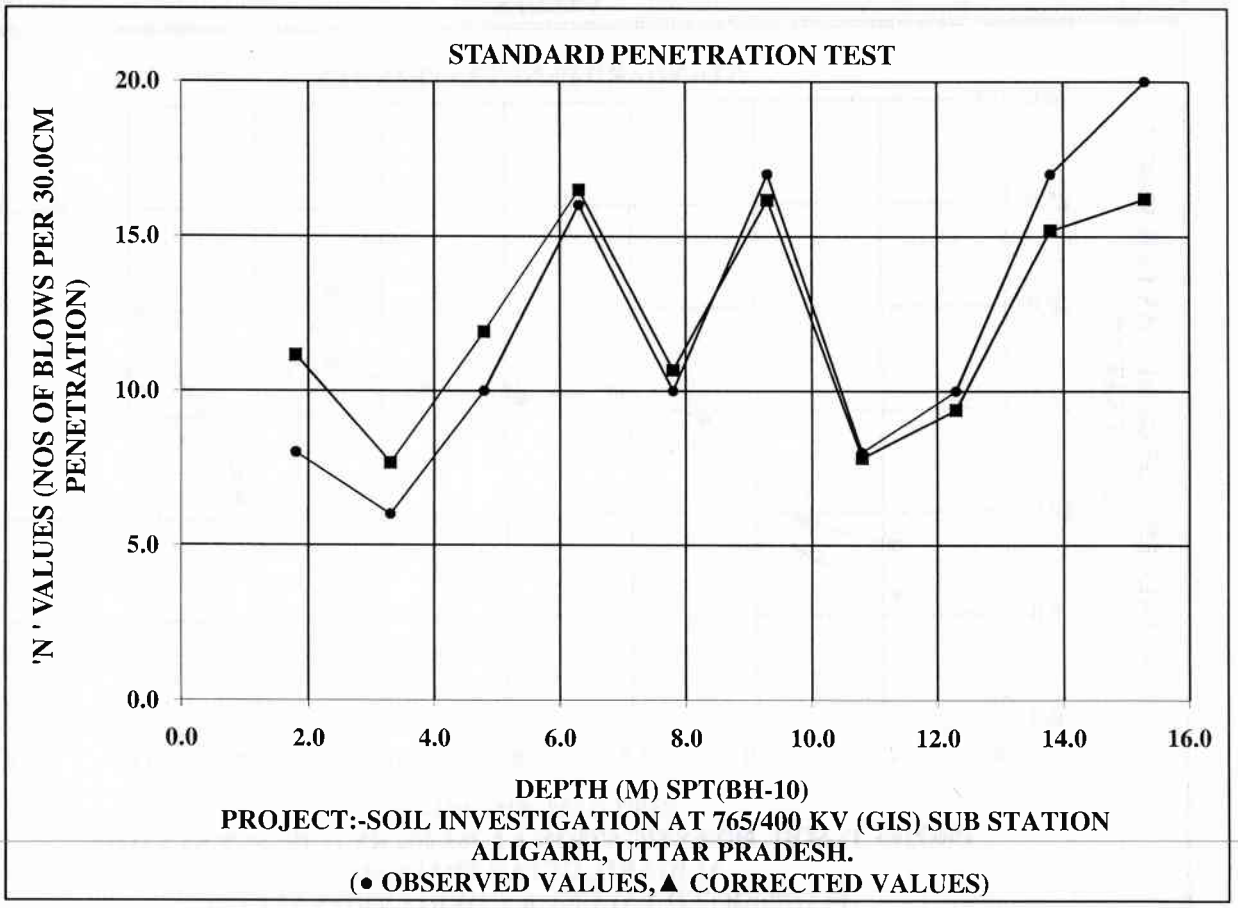
PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.
(● OBSERVED VALUES,▲ CORRECTED VALUES)


STANDARD PENETRATION TEST
'N ' VALUES (NOS OF BLOWS PER 30.0CM PENETRATION)
20.0
15.0
10.0
5.0
0.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
DEPTH (M) SPT(BH-5)
PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION
ALIGARH, UTTAR PRADESH.
(● OBSERVED VALUES,▲ CORRECTED VALUES)

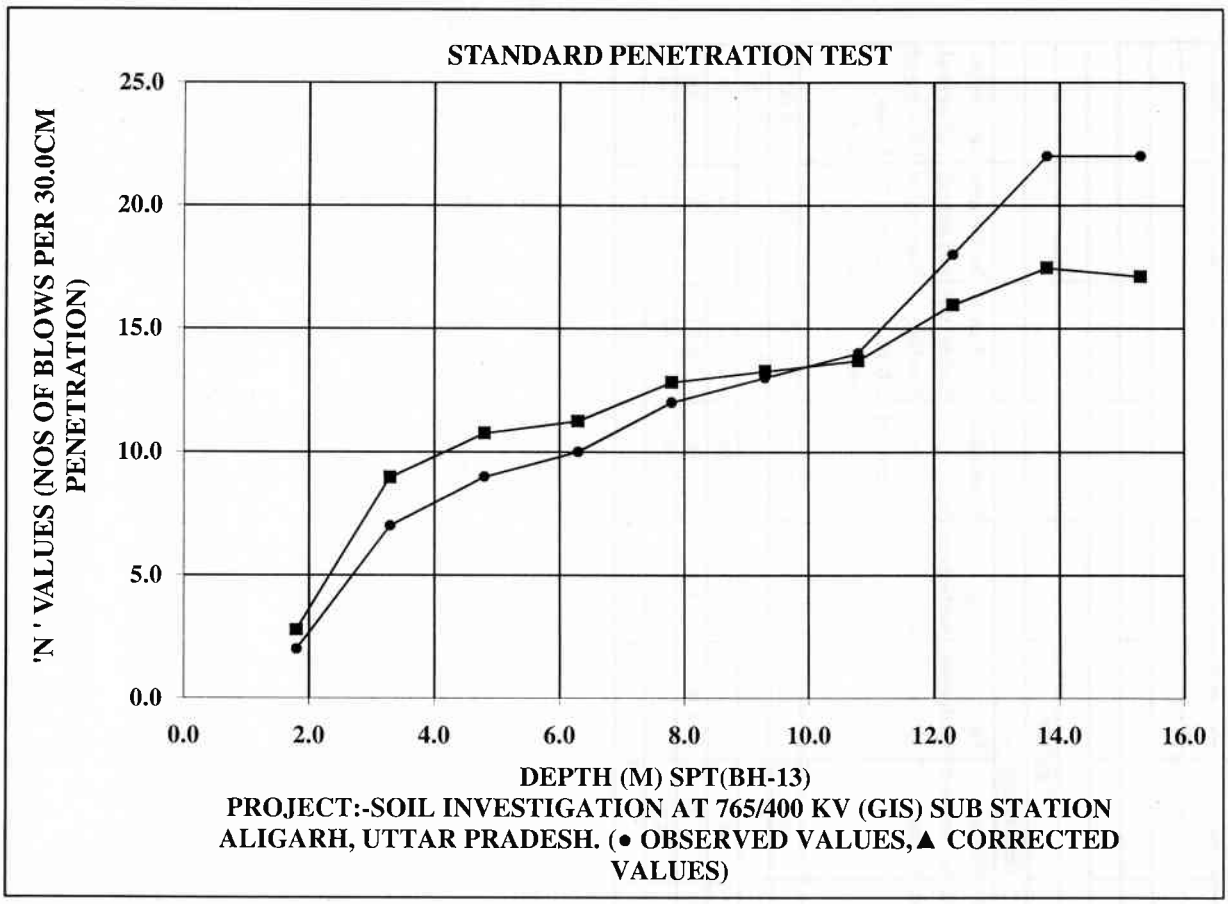

STANDARD PENETRATION TEST
'N ' VALUES (NOS OF BLOWS PER 30.0CM PENETRATION)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
DEPTH (M) SPT(BH-6)
PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION
ALIGARH, UTTAR PRADESH.
(● OBSERVED VALUES,▲ CORRECTED VALUES)



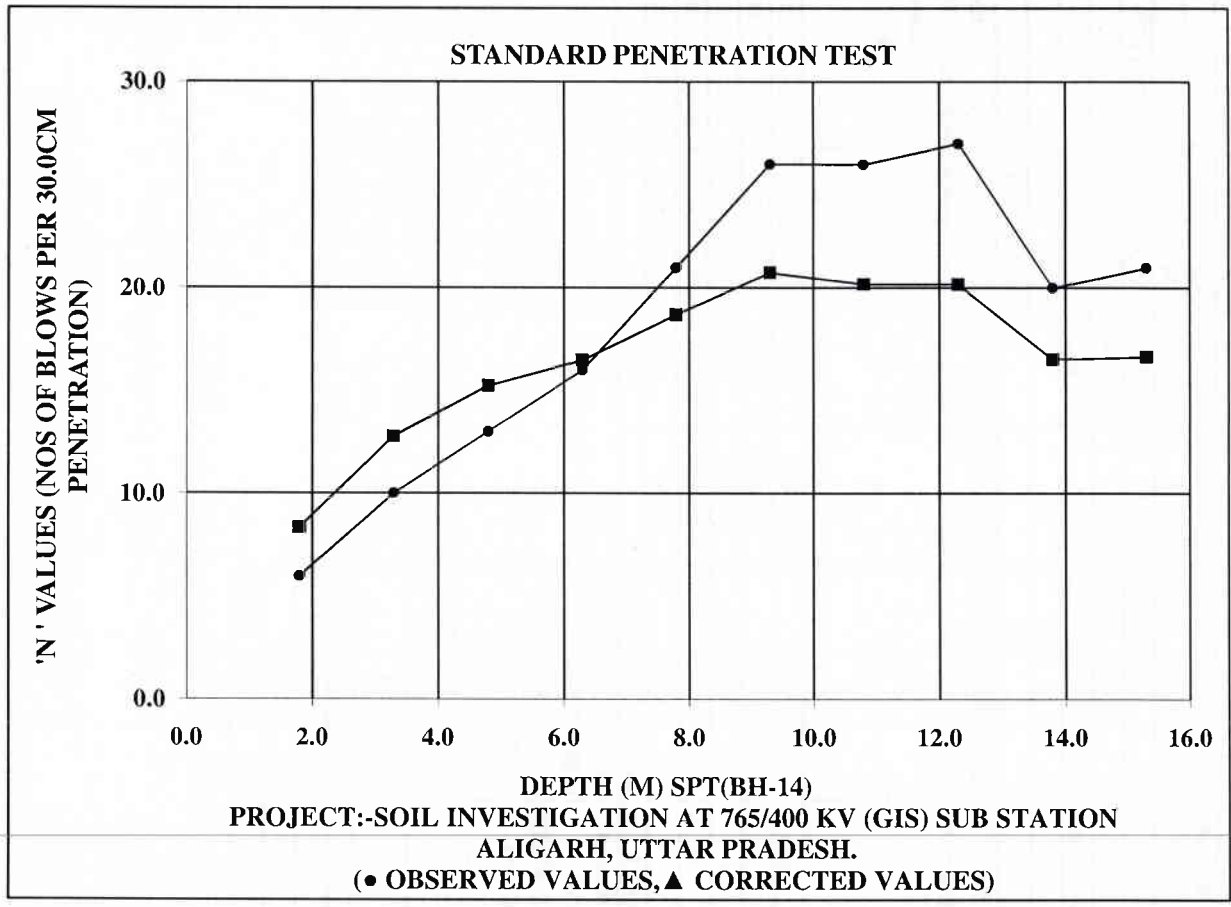
PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH. (● OBSERVED VALUES,▲ CORRECTED VALUES)



PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.
(● OBSERVED VALUES,▲ CORRECTED VALUES)



PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH. (• OBSERVED VALUES,▲ CORRECTED VALUES)



PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH.
(• OBSERVED VALUES,▲ CORRECTED VALUES)

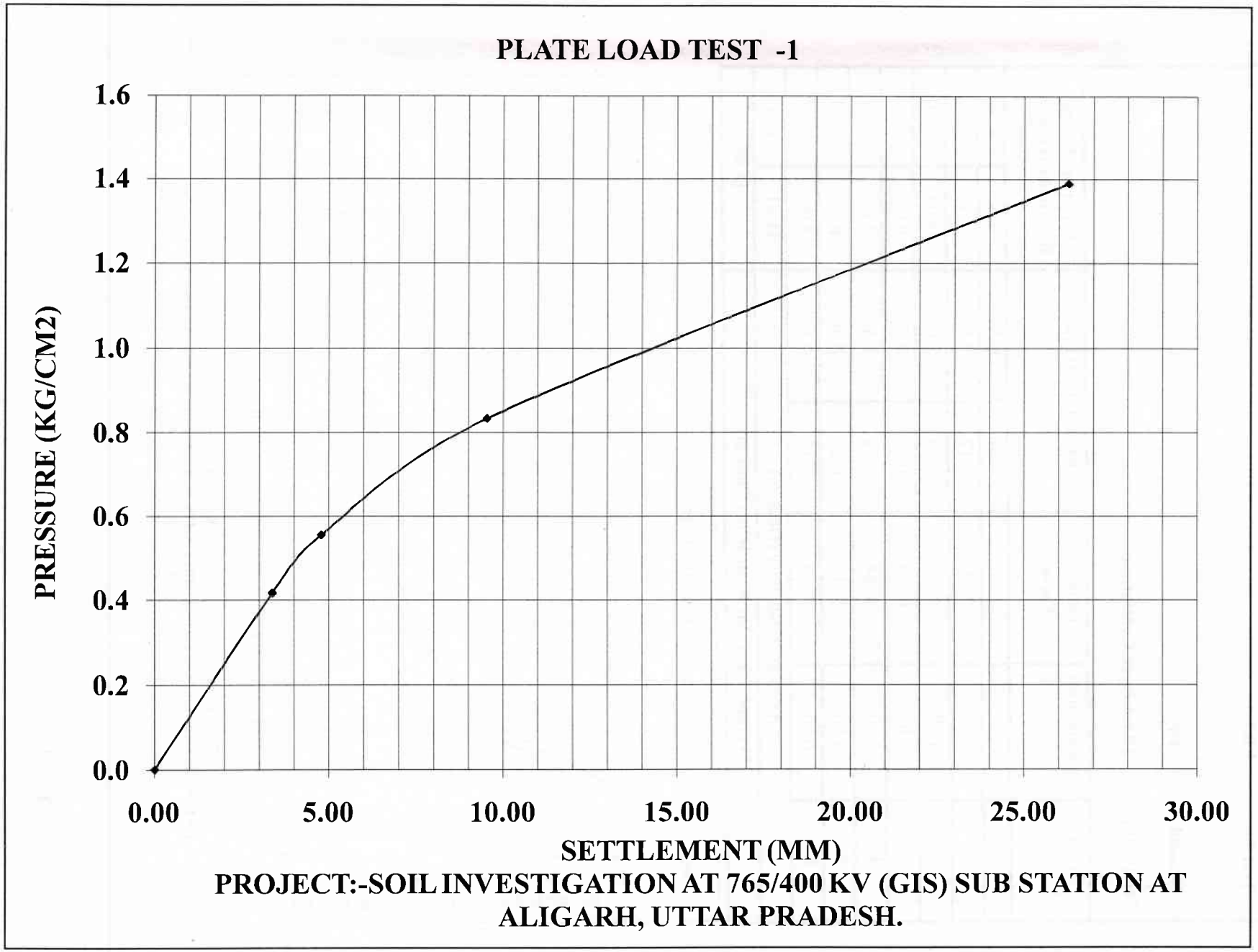
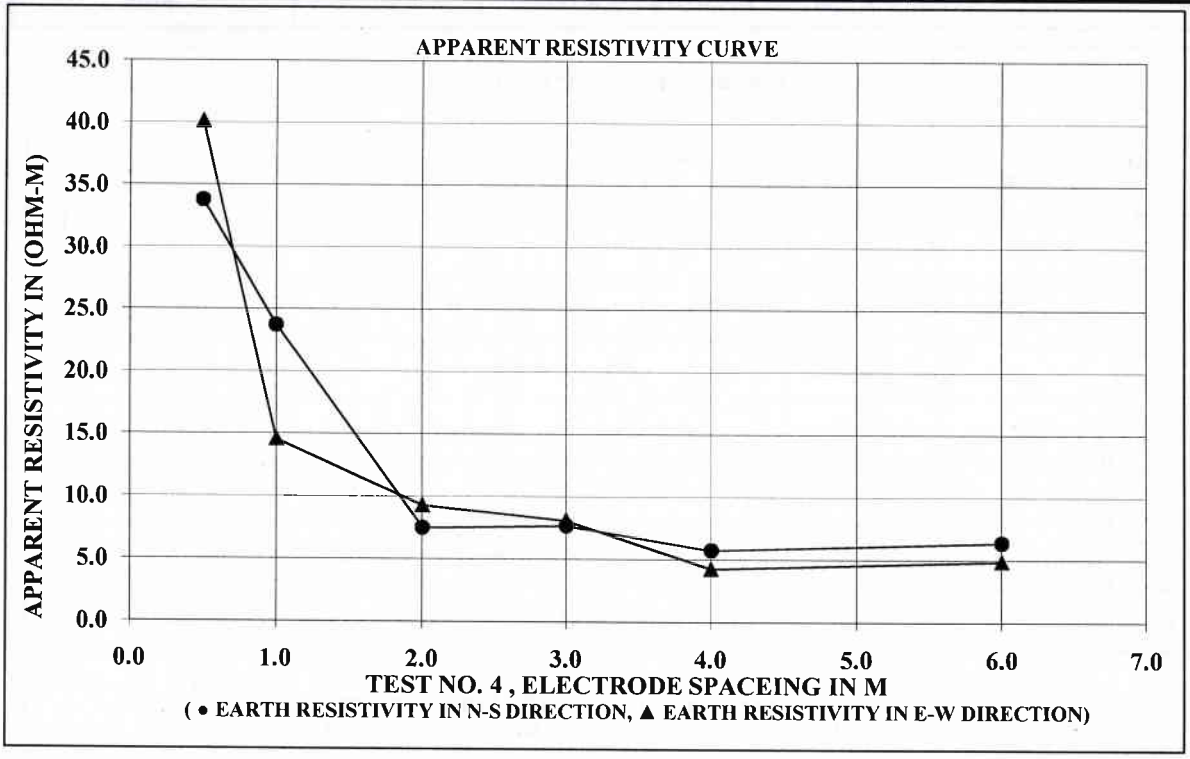


PLATE LOAD TEST -1
PRESSURE (KG/CM2)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
5.00
10.00
15.00
20.00
25.00
30.00
SETTLEMENT (MM)
PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION AT ALIGARH, UTTAR PRADESH.

PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH (Observation Sheet)

Test No	**ERT-4**
Ground Condition	**Dry**
Temprature	**19.6 Degree Centigrade**
Date	

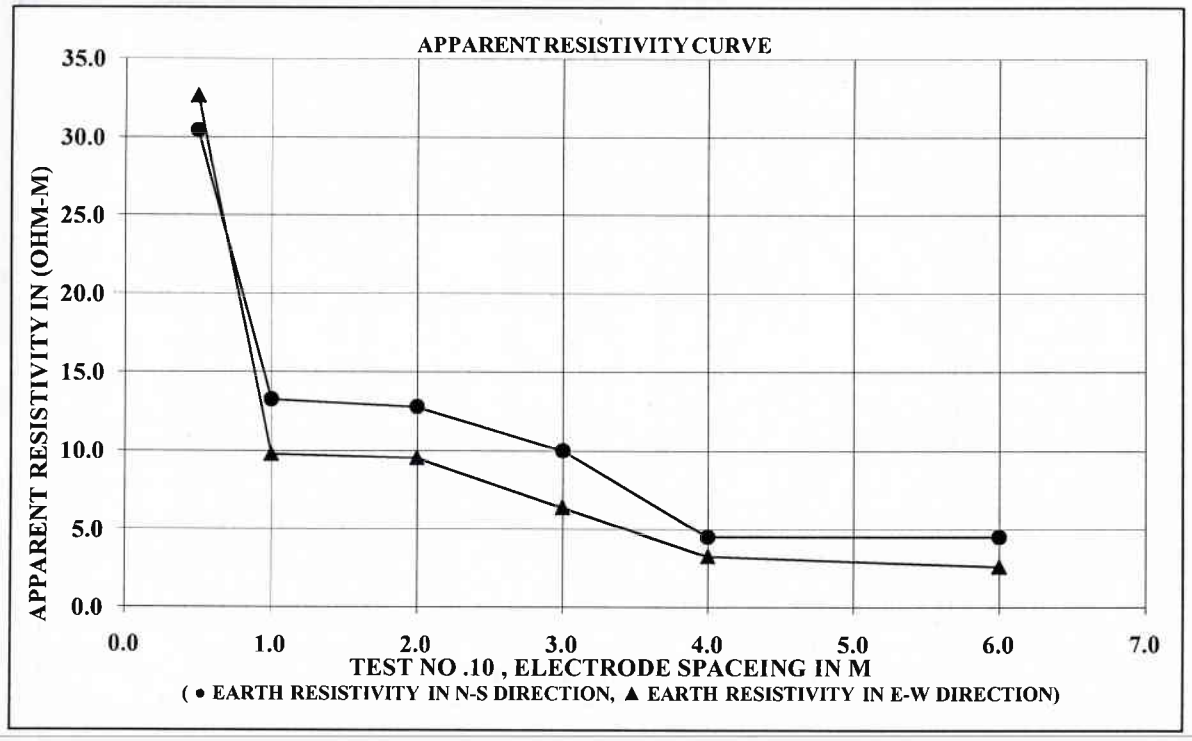
Sl No	Spacing S(m)	Geometric Factor	Resistance (Ohm)		Apparent Average Resistivity (Ohm-m)	
			N-S	E-W	N-S	E-W
1	0.50	3.14	10.76	12.78	33.79	40.13
2	1.00	6.28	3.78	2.32	23.74	14.57
3	2.00	12.56	0.60	0.74	7.54	9.29
4	3.00	18.84	0.41	0.43	7.72	8.10
5	4.00	25.12	0.23	0.17	5.78	4.27
6	6.00	37.68	0.17	0.13	6.41	4.90
Average Resistivity (Ohm-m)					**14.16**	**13.54**
Average Apparent Resistivity (Ohm-m)					**13.85**	



PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH (Observation Sheet)

Test No	**ERT-10**
Ground Condition	**Dry**
Temprature	**19.6 Degree Centigrade**
Date	

Sl No	Spacing S(m)	Geometric Factor	Resistance (Ohm)		Apparent Average Resistivity (Ohm-m)	
			N-S	E-W	N-S	E-W
1	0.50	3.14	9.70	10.40	30.46	32.66
2	1.00	6.28	2.11	1.56	13.25	9.80
3	2.00	12.56	1.02	0.76	12.81	9.55
4	3.00	18.84	0.53	0.34	9.99	6.41
5	4.00	25.12	0.18	0.13	4.52	3.27
6	6.00	37.68	0.12	0.07	4.52	2.64
Average Resistivity (Ohm-m)					**12.59**	**10.72**
Average Apparent Resistivity (Ohm-m)					**11.65**	



PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH (Observation Sheet)

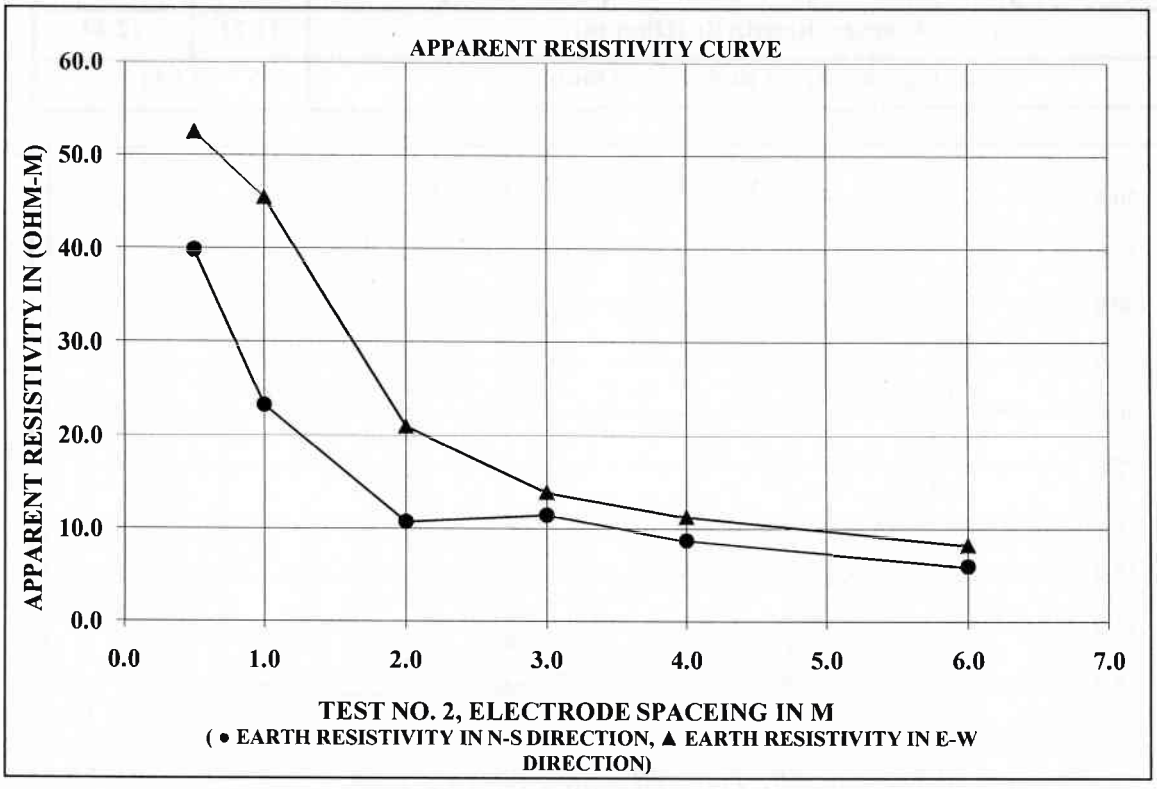
Test No **ERT-2**

Ground Condition **Dry**

Temprature **19.6 Degree Centigrade**

Date

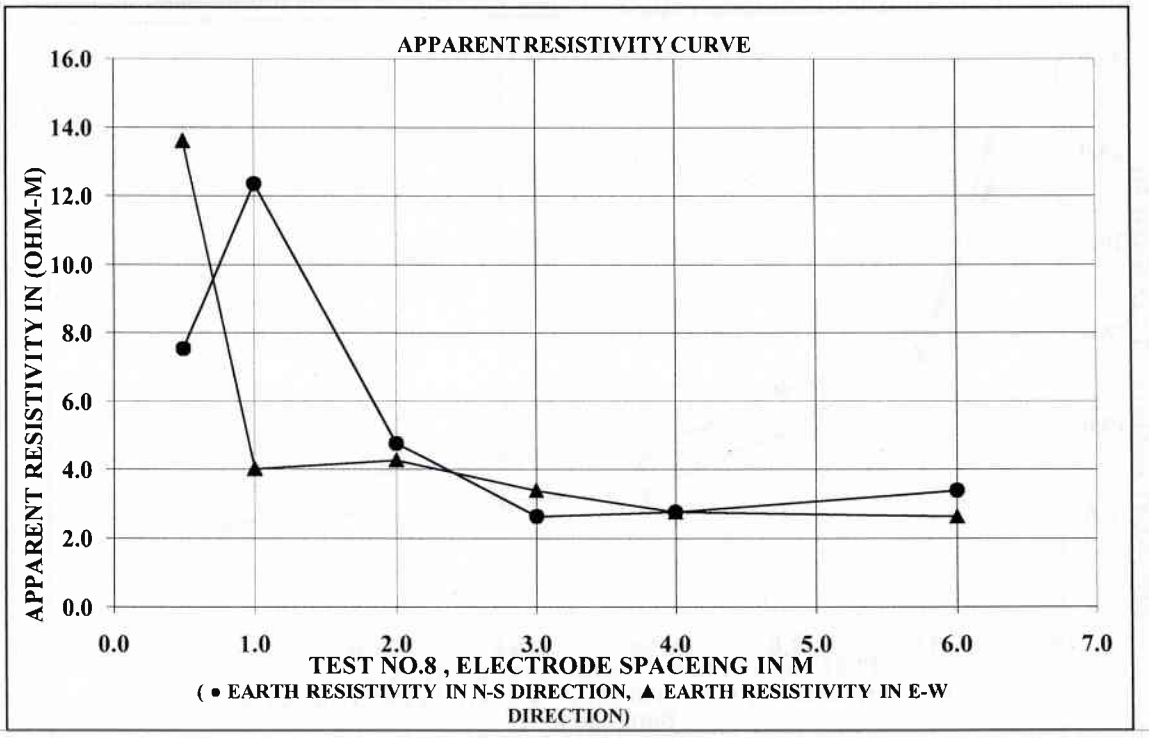
Sl No	Spacing S(m)	Geometric Factor	Resistance (Ohm)		Apparent Average Resistivity (Ohm-m)	
			N-S	E-W	N-S	E-W
1	0.50	3.14	12.70	16.74	39.88	52.56
2	1.00	6.28	3.71	7.24	23.30	45.47
3	2.00	12.56	0.86	1.67	10.80	20.98
4	3.00	18.84	0.61	0.74	11.49	13.94
5	4.00	25.12	0.35	0.45	8.79	11.30
6	6.00	37.68	0.16	0.22	6.03	8.29
Average Resistivity (Ohm-m)					**16.72**	**25.42**
Average Apparent Resistivity (Ohm-m)					**21.07**	



PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH (Observation Sheet)

Test No	**ERT-8**
Ground Condition	**Dry**
Temprature	**19.6 Degree Centigrade**
Date	

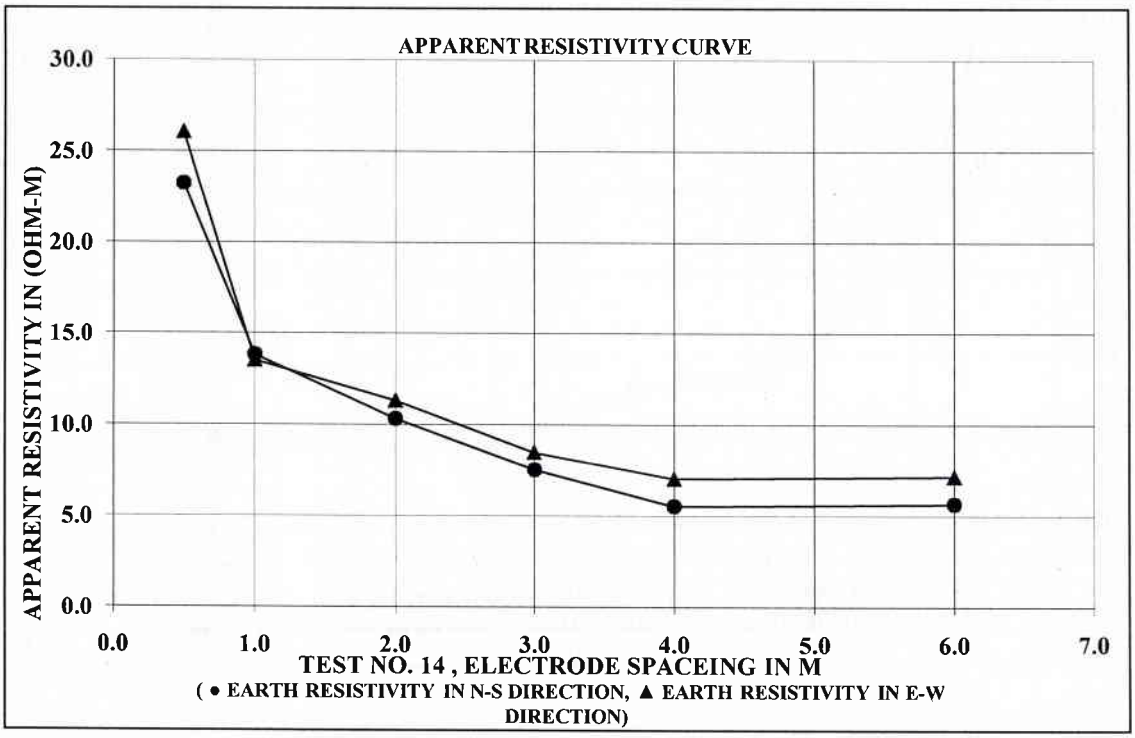
Sl No	Spacing S(m)	Geometric Factor	Resistance (Ohm)		Apparent Average Resistivity (Ohm-m)	
			N-S	E-W	N-S	E-W
1	0.50	3.14	2.40	4.34	7.54	13.63
2	1.00	6.28	1.97	0.64	12.37	4.02
3	2.00	12.56	0.38	0.34	4.77	4.27
4	3.00	18.84	0.14	0.18	2.64	3.39
5	4.00	25.12	0.11	0.11	2.76	2.76
6	6.00	37.68	0.09	0.07	3.39	2.64
Average Resistivity (Ohm-m)					**5.58**	**5.12**
Average Apparent Resistivity (Ohm-m)					**5.35**	



PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH (Observation Sheet)

Test No	**ERT-14**
Ground Condition	**Dry**
Temprature	**19.6 Degree Centigrade**
Date	

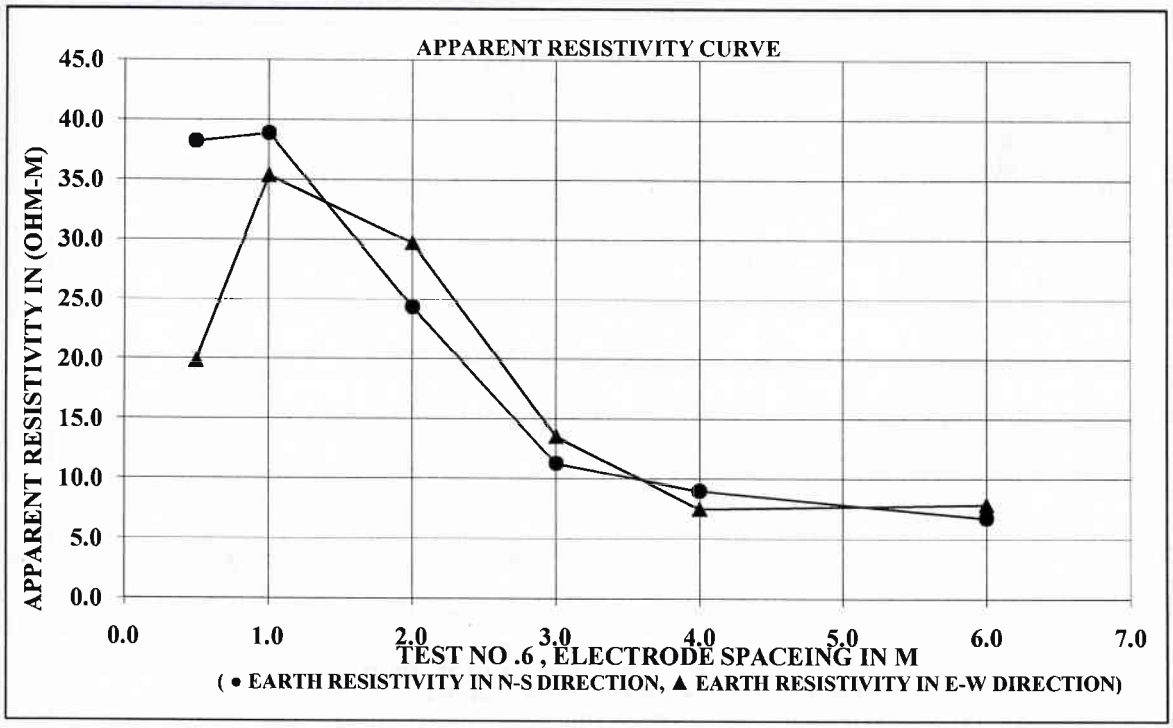
Sl No	Spacing S(m)	Geometric Factor	Resistance (Ohm)		Apparent Average Resistivity (Ohm-m)	
			N-S	E-W	N-S	E-W
1	0.50	3.14	7.40	8.30	23.24	26.06
2	1.00	6.28	2.20	2.15	13.82	13.50
3	2.00	12.56	0.82	0.90	10.30	11.30
4	3.00	18.84	0.40	0.45	7.54	8.48
5	4.00	25.12	0.22	0.28	5.53	7.03
6	6.00	37.68	0.15	0.19	5.65	7.16
Average Resistivity (Ohm-m)					**11.01**	**12.26**
Average Apparent Resistivity (Ohm-m)					**11.63**	



PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH (Observation Sheet)

Test No	ERT-6
Ground Condition	Dry
Temprature	19.6 Degree Centigrade
Date	

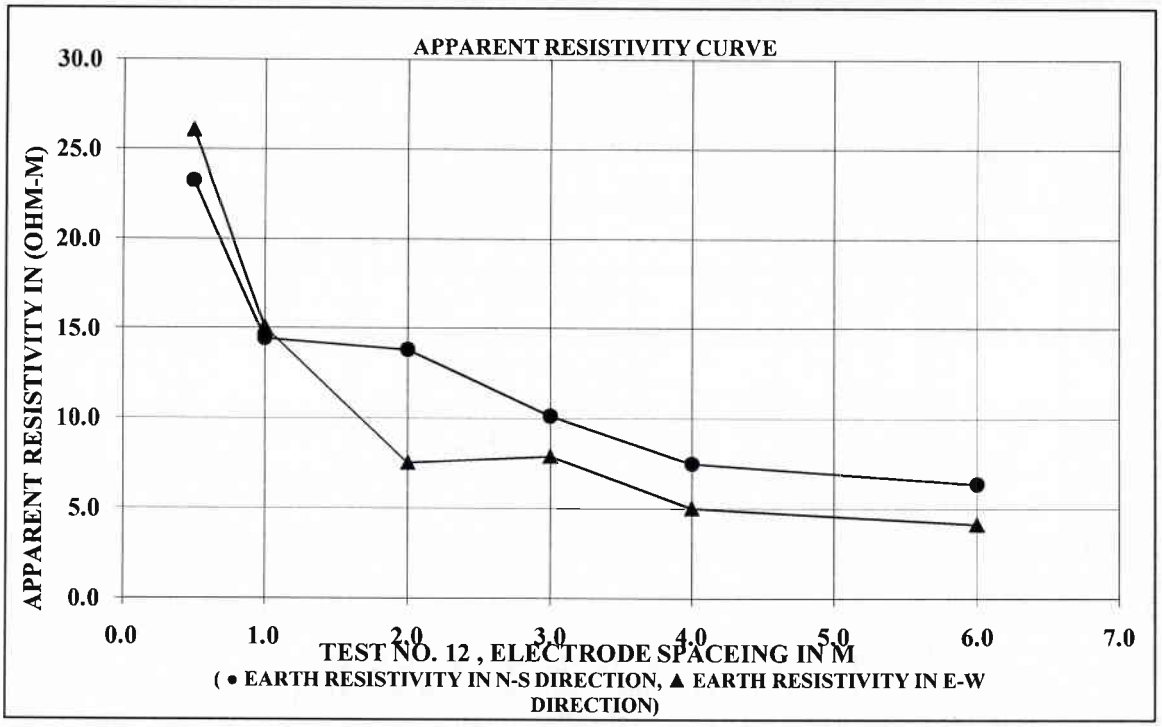
Sl No	Spacing S(m)	Geometric Factor	Resistance (Ohm)		Apparent Average Resistivity (Ohm-m)	
			N-S	E-W	N-S	E-W
1	0.50	3.14	12.19	6.33	38.28	19.88
2	1.00	6.28	6.20	5.64	38.94	35.42
3	2.00	12.56	1.94	2.37	24.37	29.77
4	3.00	18.84	0.60	0.72	11.30	13.56
5	4.00	25.12	0.36	0.30	9.04	7.54
6	6.00	37.68	0.18	0.21	6.78	7.91
Average Resistivity (Ohm-m)					**21.45**	**19.01**
Average Apparent Resistivity (Ohm-m)					**20.23**	

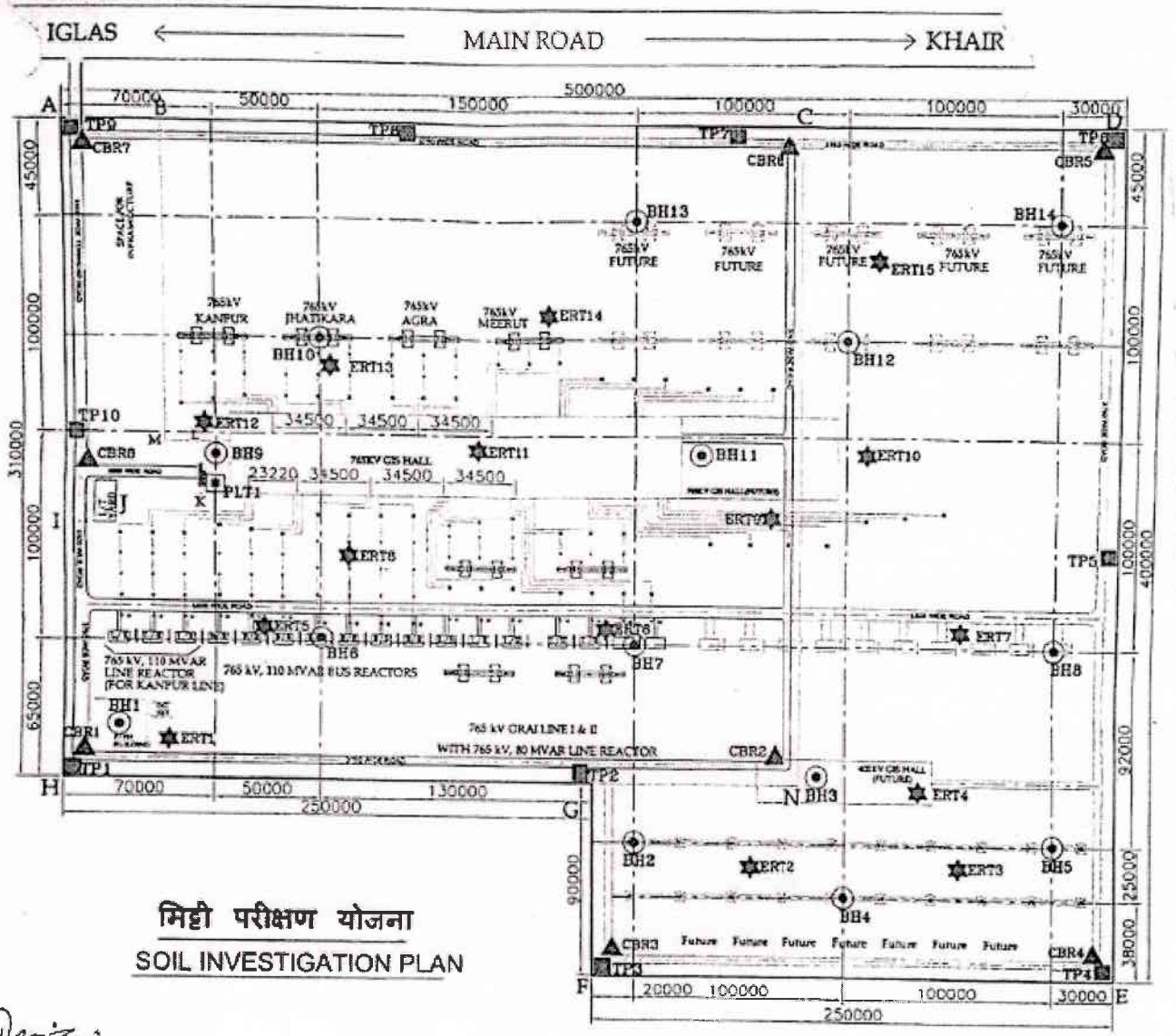


PROJECT:-SOIL INVESTIGATION AT 765/400 KV (GIS) SUB STATION ALIGARH, UTTAR PRADESH (Observation Sheet)

Test No	**ERT-12**
Ground Condition	**Dry**
Temprature	**19.6 Degree Centigrade**
Date	

Sl No	Spacing S(m)	Geometric Factor	Resistance (Ohm)		Apparent Average Resistivity (Ohm-m)	
			N-S	E-W	N-S	E-W
1	0.50	3.14	7.40	8.30	23.24	26.06
2	1.00	6.28	2.30	2.40	14.44	15.07
3	2.00	12.56	1.10	0.60	13.82	7.54
4	3.00	18.84	0.54	0.42	10.17	7.91
5	4.00	25.12	0.30	0.20	7.54	5.02
6	6.00	37.68	0.17	0.11	6.41	4.14
Average Resistivity (Ohm-m)					**12.60**	**10.96**
Average Apparent Resistivity (Ohm-m)					**11.78**	





मिट्टी परीक्षण योजना

SOIL INVESTIGATION PLAN

N

3

NOTES:–

1. ALL DIMENSIONS ARE IN mm UNLESS SPECIFIED OTHERWISE.
2. THE DRAWING SHALL BE REFERED FOR LOCATION OF POINTS FOR SOIL INVESTIGATION ONLY.
3. DURING EARTH RESISTIVITY MEASUREMENT, IF THE RESISTIVITY AT ANY TEST LOCATION IS FOUND TO BE APPRECIABLY DIFFERENT FROM RESISTIVITY AT OTHER TEST LOCATIONS, THEN RESISTIVITY MEASUREMENT SHALL BE PERFORMED AT ADDITIONAL TEST LOCATIONS IN THE VICINITY OF SUCH TEST LOCATION, TEST ELECTRODE SPACING SHALL BE 0.5, 1.0, 2.5, 10, 25 & 60 METRES.
4. NGL AT THE LOCATION OF BH,PLT & TP MUST BE RECORDED.

INDEX:–

- BH – BORE HOLE 14 NO.S
- PLT – PLATE LOAD TEST 01 NO.S
- TP – TRIAL PIT TEST 10 NO.S
- CBR – CALIFORNIA BEARING RATIO TEST 08 NOS
- ERT – EARTH RESISTIVITY TEST 15 NO.S

निर्माण हेतु जारी
RELEASED FOR CONSTRUCTION

25.08.15

PREP:	REVD: ELCT.	REVD:	REVD:	APPD:	DATE: 21/8/15	NIS:

पावरग्रिड कार्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उपक्रम)
POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

परियोजना : 765 के.वी. अलीगढ़ (नया) जी आई एस उप स्टेशन
PROJECT : 765kV ALIGARH (NEW) GIS SUB STATION

शीर्षक : मिट्टी परीक्षण
TITLE : SOIL INVESTIGATION

ड्रा. सं.: C/ENGG/NR/GIS/ALIGARH/SOIL TP/01 (SH.01 OF 01)
DRG.NO.:

संशोधन : 0 REV-0.