

GEO TECHNICAL INVESTIGATION REPORT

REPORT No.: GT / 1492 / 2018-19

PROJECT: Proposed (G+2 Floors) Building in MN S & T Park at Shameerpet, Hyderabad

CLIENT: M/s TMN Parks Private Limited

W.O. Ref.: GT/QUO/Soil/2018-19/148 dt. 31.8.2018

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**GEOTECHNICAL
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ISO 9001:2015 COMPANY**



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1. INTRODUCTION

M/s TMN Parks Private Limited has assigned to M/s GEO TECHNOLOGIES Soil investigation work for proposed Building in their premises at Shameerpet, Hyderabad, vide Ref. GT/QUO/Soil/2018-19/148 dt. 31.8.2018.

was conducted by drilling five (5) boreholes, conducting standard Penetration Tests, and lab testing of soil samples.

The results of this investigation and recommendations are presented in this Report. All the investigations are conducted in accordance with the relevant IS Codes.

2. FIELD INVESTIGATIONS

DRILLING:

The bore holes were drilled at the locations specified by the client (Fig.1). Table-1 gives details of the bore holes drilled.

Rotary Drilling was performed as per IS: 1892. The size of the casing used was 150 / 90 mm.

The following information was collected during the drilling operations:

- | | |
|--------------------------|---------------------------|
| - Nature of strata | - Details of soil samples |
| - Colour of Return Water | - Rate of drilling |

STANDARD PENETRATION TEST (SPT):

Standard Penetration Tests were conducted at 1.5 m depth intervals in the bore holes, in accordance with IS: 2131-1981. Soil samples were carefully extracted from the split-spoon sampler and preserved in polythene bags.

SOIL SAMPLES:

Undisturbed and Disturbed soil samples were collected as per IS: 2132 from the boreholes.

All the samples collected from the bore holes and the trial pit were properly packed, labeled and transported to Geo Technologies Soil Testing Laboratory at Hyderabad.

FIELD BORE LOGS:

All the details collected from the field operations are presented in Logs of Bore holes in Annexure-1 at the end of this Report. These logs contain depth wise strata details, depth and type of samples collected, results of Standard Penetration Tests, CR & RQD, drilling rate and colour of return water etc.

3. LABORATORY TESTING

The samples were tested at the Soil Testing Laboratory of M/s GEO TECHNOLOGIES at Hyderabad.

The following tests were performed on the Soil samples from the boreholes and the trial pit:

- Natural Moisture Content
- Atterberg Limits (LL, PL, PI, SL)
- Grain size analysis
- In situ Dry Density
- Shear tests

All the tests were conducted in accordance with IS: 2720 (Methods of Tests for Soils).

The following tests were conducted on rock cores:

- Specific Gravity
- Porosity
- Water absorption
- Unconfined compressive test

The tests were performed as per IS: 1124 and IS: 9143.

4. RESULTS

Fig. 2 gives the combined bore log, showing the sub soil profile.

Table-2 gives the results of tests on soil samples.

Table-3 gives the results of tests on rock samples.

Appendix gives the calculations for SBC.

5. SUB-SOIL PROFILE

The generalized subsoil profile in the boreholes is as follows:

Depth, m	Strata	N Value
0.00 – 1.20	Filling / Silty sand	-
1.20 – 3.00	Silty gravel / Gravel	31 – 38
3.00 – 6.00	Soft Disintegrated Rock (SDR) / Hard rock	>50 & Cores

At the time of drilling, no water is seen in the boreholes.

6. RECOMMENDATIONS

The following recommendations are made for proposed construction of (G+4 Floors) Building in MN S & T Park at Shameerpet, Hyderabad. These are based on exploratory core drilling of five (5) boreholes.

- a) The generalized subsoil profile in the boreholes is as follows:

Depth, m	Strata	N Value
0.00 – 1.20	Filling / Silty sand	-
1.20 – 3.00	Silty gravel / Gravel	31 – 38
3.00 – 6.00	Soft Disintegrated Rock (SDR) / Hard rock	>50 & Cores

- b) At the time of drilling, no water was seen in the boreholes till 6.0 m depth.

- a) Open foundations (Footings) are recommended at 2.0 / 3.0 m depth, to be rested in gravel / SDR.

- b) SBC is recommended as follows:

Depth, m	Foundations resting in	Recommended SBC, t/m ²
2.0	Gravel	25
3.0	SDR	35

- a) All foundations should be backfilled with well-compacted gravelly morum. The top filling / silty soil (up to about 1.2 m) is not suitable for any backfilling.

- b) Loose boulders should be fully removed before placement of PCC bed.

For **GEO TECHNOLOGIES**

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TABLE-1: SUMMARY OF DRILLING

S No.	BH No.	Depth drilled, m	Water Table, m	Remarks
1	BH-1	6.0	Nil	-
2	BH-2	3.0	Nil	Hard rock from 1.0 m
3	BH-3	5.5	Nil	Hard rock from 3.5 m
4	BH-4	6.0	Nil	-
5	BH-5	5.5	Nil	Hard rock from 3.5 m

TABLE – 2: RESULTS OF LAB TESTS SOIL SAMPLES

S. No.	BH No.	Depth, m	Soil	Atterberg Limits			γ_b	Grain Size, %			Triaxial Shear	
				LL	PL	PI		Gr	Sa	Si+Cl	C	Φ deg
1	BH-1	1.5	Gravel	NP	-	-	18.7	49	42	9	0	34
2	BH-3	1.5	Gravel	NP	-	-	18.6	46	43	11	0	33
3	BH-4	1.5	Gravel	NP	-	-	18.5	45	39	16	10	33

NOTATION: Gr ... Gravel Sa ... Sand Si ... Silt Cl... Clay

LL: Liquid limit %; PL: Plastic Limit %; PI: Plasticity Index; γ_b : Insitu density

C: Cohesion kN/m²; Φ : Angle of Internal Friction, degrees.

TABLE-3: RESULTS OF TESTS ON ROCK SAMPLE

S.No.	B H No.	DEPTH OF SAMPLE (m)	CR%	RQD%	SPECIFIC GRAVITY	POROSITY (%)	WATER ABSORPTION (%)	UCS* kg/ sq cm
1	BH-2	1.0 – 2.0	68	22	2.71	1.12	0.83	670
2		2.0 – 3.0	73	30	2.72	1.15	0.95	730
3	BH-3	3.5 – 4.5	64	30	2.72	1.05	0.90	680
4		4.5 – 5.5	68	32	2.73	1.12	1.00	675
5	BH-5	3.5 – 4.5	69	23	2.71	1.15	0.97	760
6		4.5 – 5.5	70	27	2.72	1.10	0.96	640

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APPENDIX: CALCULATION OF SBC FOR OPEN FOUNDATIONS

Foundations in Silty gravel / gravel:

a) Shear criterion:

Assumed Depth of foundation $D = 2.0$ m; Assumed width of foundation $B = 2.0$ m

$\gamma = 18.5 \text{ KN/m}^3$; $c = 0 \text{ KN/m}^2$ $\phi = 32^\circ$.

$N_c = 27.23$ $N_q = 16.55$ $N_r = 20.54$

Net, Ult B.C. = $1.3 c N_c + r' D (N_q - 1) + 0.4 r' B N_r = 875 \text{ KN per sq m}$

With a F.S. of 3.0, SBC = 291 KN per sq m

b) Settlement Criterion:

Assuming average N value as 20, for permissible settlement of 40 mm,

Allowable Bearing Pressure = $12.25 N (B + 0.3) / B = 281 \text{ kN / sq m}$

Recommended Safe Bearing Capacity is 25 t per sq m

For foundations in SDR at 3.0 m depth SBC may be taken as 35 t/sq m.

ANNEXURE - 1

FIELD BORE LOGS