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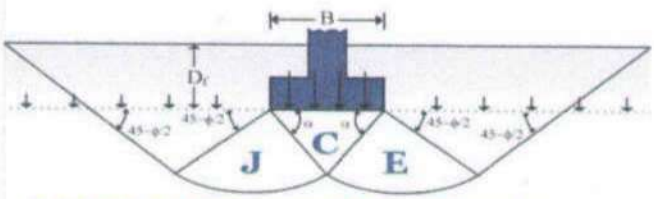
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JOSMAR CONSULTING ENGINEERS

GEOTECHNICAL ENGINEERING DIVISION



JOSMAR *Consulting Engineers*

GEOTECHNICAL INVESTIGATION REPORT

Client:

M/s. Shri Raman Developers

Site Address:

"S.L.ANANDAN TOWERS " Old Door No. 336 to 344,New Door No: 336, Poonamallee High Road,Aminjikarai Village, Chennai – 600029. Comprised in old S.No:70/1part. T.S.No:2/8, Aminjikarai Village, Aminjikarai taluk, Chennai -600029.

REPORT NO. JCE/GEOTECH/2023/061

JOSMAR CONSULTING ENGINEERS CHENNAI-42

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CONSULTING ENGINEERS JOSMAR CHENNAI-42

INTRODUCTION

This report presents the results of the geotechnical investigations carried out by JOSMAR Consulting Engineers, Geotechnical Engineering Division, for the proposed construction of (Stilt+3) commercial building, located at New Door Nos. 336 to 344, Old No. 336, Poonamallee High road, Aminjikarai, Chennai - 600029.

This work was authorized by the Client, **M/s. Shri Raman Developers.**

Two boreholes have been requested by the client for the land area measuring about 7686 sq ft. Our recommendations are based on these two bore holes only.

Standard penetration tests were conducted at the bore hole drilled at site, up to a maximum depth of 24.00m below existing ground level.

The investigation consists of drilling two bore holes, soil sampling, field and laboratory testing and preparation of a Geotechnical Report for the proposed construction of (Stilt+3) commercial Building.

SCOPE OF WORK

The scope of this investigation is to:

i) Determine the soil profile at site, with ground water observation.
ii) Recommend a suitable foundation system and safe bearing pressure at foundation level.

Two (2) bore holes were drilled to a maximum depth of 24.00m below existing ground level.
Soil samples were collected for visual identification, classification and laboratory testing.

Key plan & bore hole location plan are presented in Appendix- A.
Bore hole logs and cross section are presented in Appendix- B.
Laboratory test results are presented in Appendix- C.
Pile Capacity calculations are presented in Appendix-D.

SITE DESCRIPTION

The site for the proposed construction of (Stilt+3) commercial building is located at New Door Nos. 336 to 344, Old No. 336, Poonamallee High road, Aminjikarai, Chennai - 600029.
The site is located where it is surrounded by main road (EVR road) in the immediate north direction and Cooum river in the west direction at about 15m. While there is residential houses in east and south directions.

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EXPLORATION PROGRAM & TECHNIQUES

After the visual inspection of the site, the subsurface investigation was carried out as mentioned below:

Two (2) exploration boreholes were drilled up to a maximum depth of 24.00m

BH-1 was started on 21st July 2023 and completed on 21st July 2023
BH-2 was started on 21st July 2023 and completed on 22nd July 2023

Boreholes were drilled at site, in order to obtain an average soil profile of the site. Rotary drilling was performed using water as drilling fluid in the sub soil with casing pipe to stabilize the borehole up to the required depth. Field testing and sampling are conducted in accordance with IS: 2131-1981.

Standard penetration tests (SPTs) were performed on the sub soil. In this test, a standard split spoon (IS:9640-1980) of length about 450mm and external/ internal diameter of 51/35 mm initially penetrates the soil for 15cm to bypass the expected accumulated sludge at the bottom of the hole by means of a 63.5 kg (140 lbs.) hammer falling freely along a guide from a height of 750 mm.

The total number of blows (N) required, to advance the spoon into the bore, for another two successive 15cm (total of 30cm) is recorded as a measure of the soil relative density or consistency.

The field work was carried out under the close supervision of our engineer in accordance with Indian Standard mentioned earlier.

LABORATORY TESTING PROGRAM

All the extracted soil samples were brought to the Geotechnical & Materials Testing Laboratory of JOSMAR *Consulting Engineers* for further examination in accordance with IS:1498-1970.
Soil samples were subjected to the following physical tests.

1. Moisture Content (IS: 2720 Part II- 1973)
2. Sieve Analysis (IS: 2720 Part IV- 1985)
3. Liquid Limit (IS: 2720 Part 5, 1985)
4. Plastic Limit (IS: 2720 Part 5, 1985)
5. Differential free swell Index (IS: 2720 Part 40, 1977)

The laboratory test results are presented in Appendix- C.

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SUBSURFACE SOIL DESCRIPTION

Based on the borehole information, the sub surface soil profile at the proposed site is given below.

Borehole No.	Depth (m)	Soil Description	Relative density / Consistency
01	0.00 to 3.00	Filling sand (Brown sand with boulders)	-

Borehole No.	Depth (m)	Soil Description	Relative density / Consistency
02	0.00 to 4.00	Filling soil (Brown sand)	-
	4.00 to 24.00	Brownish poorly graded sand (SP) and Brownish silty sand (SM)	Medium dense to Very dense

GROUND WATER

Water table was encountered at about 6.50m below the existing ground level during the time of field investigation. However, it may fluctuate due to seasonal variations and local sewerage disposal practices.

FOUNDATION ANALYSIS

Given the site conditions, shallow foundation system is not feasible for the proposed building, as the depth of filling soil is found to be about 4.00m below the main road level. Calculating Bearing capacity is not recommended on filling soil since it is not reliable. Hence pile foundation is recommended for the proposed stilt+3 building in this site. Pile foundation calculation is presented in appendix- D.

FOUNDATION RECOMMENDATION

PILE FOUNDATION

Pile foundation system shall be adopted for the proposed structure by terminating the piles in the deep strata. It is a normal practice to adopt same pile lengths, for better interaction and to achieve uniform settlements.

Pile load tests have to be done in order to confirm the calculated pile capacities.

Under each column, there should be a pile cap to transfer the support load to the carrying piles. The bottom level of the all pile caps shall be kept at 1.0m below the ground level. dimensions of pile caps could be estimated according to the required number considered center to center spacing between piles.

A pile length of 16.00m depth below the main road level has been analyzed below. The corresponding pile capacities are given. Selection of pile length was estimated according to the soil profile and soil stiffness as obtained from SPT N- values.

PILE CAPACITIES

The piles utilizing friction and also small end bearing capacities shall be adopted for the proposed structure. The pile capacities of the bored, cast in situ piles are worked out considering a depth of 16.00m below ground level as the top of pile level. Estimation of pile capacities are given below with reference to the boreholes drilled at site.

PILE LOAD CAPACITIES (Ref BH-02)				
Pile Depth (m)	**Pile Diameter (mm)**	**(Factor of Safety=2.5) Allowable Pile Load Capacity (kN)**	**Lateral load bearing capacity (kN)**	**Uplift Resistance (kN)**
16.00	600	430	34.4	100
16.00	750	760	60.8	130
16.00	1000	1330	106.4	170

Note:

I. **The above recommendations are given by assuming similar soil strata in the whole site area. The site is vast area and the recommendations are based on only two boreholes only. In case of any variations in the soil profile, the above recommendations are not applicable and further investigation shall be carried out.**

II. **Since the site is elevated by almost 5.50m from the adjacent river level. Retaining walls shall be provided around the site up to minimum of 8m deep.**

III. **Since the site has very much variation in elevation, proper drainage arrangement should be made including soil erosion resistant measures. Because the performance of the foundation will be affected by abrupt variation in lateral confinement of the foundation.**

PILE GROUPING

The group efficiency shall be worked out based on number of piles in a group. Piles shall have a minimum spacing of 2.5 times diameter centre to centre or minimum 1.5 times diameter as clear spacing in order to mobilise frictional resistance, which is a key factor in achieving better pile capacities. Larger spacing is always preferable, in case of bored piles.

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PILE GROUP EFFICENCY

Pile group efficiency will depend on the pattern of arrangement of piles and number of piles in a group. An efficiency of about 60 to 70% shall be considered for the onsite soil condition, in general. However, it shall be decided based on pile load tests. Sequence of casting of piles shall be such that the adjacent piles do not get affected during pile drilling. Tremie concrete shall be carried out in order to minimize segregation. Water-cement ratio shall also be controlled in order not to be affected by water, existing inside the pile boring. Gradual pull out of pile casing is necessary, to avoid necking of piles.

UPLIFT CAPACITY

Uplift capacity of piles shall be considered as 50% of the ultimate frictional capacity of piles.

PILE TESTING

The group efficiency shall be worked out based on number of piles in a group. However, Pile load tests are recommended to observe the performance of the piles and to re-confirm the theoretical pile capacities. Load tests to be carried out after a minimum period of 1 week after driving of pile. Pile load tests should be conducted by loading up to 1.5 times the service load on working pile, while minimum two times the service load on pilot piles. **Pile load tests and Pile Integrity tests can be conducted for this project.**

EARTH PRESSURE AND SOIL PARAMETERS FOR RETAINING WALL

Since it is required to raise the level of site up to main road level, retaining walls shall be constructed to make sure the soil withstands in the vertical direction all around the site. Height of retaining wall shall be at least 8m below the existing road level. The coefficients of active, at rest and passive earth pressure (K_a, K_o, K_p) are provided to estimate the earth pressure against retaining walls. The value of these factors depends on type of the soil and its degree of compaction in general. Average angle of internal friction value shall be considered as 30°. In general, value of K_a= 0.33, K_0= 0.50, K_p= 3.00 and γ_{bulk} =18 kN/m^3 are applicable for the requirements of lateral support system design.

- ✓ γ_{bulk}- Unit Weight of Soil; φ - Friction Angle
- ✓ Ko – At Rest Earth Pressure = (1-sinφ);
- ✓ Ka – Active Earth Pressure = (1-sinφ)/ (1+sinφ);
- ✓ Kp – Passive Earth Pressure= (1+sinφ)/ (1-sinφ).



BACKFILLING AND COMPACTION

Excavated soil is not recommended to be used as backfill material as it is having large amount of boulders mixed with soil. As per general practice, the backfill material should not contain more than 15% fines passing 0.075mm sieve, retain 40% on 4.75mm size sieve while the maximum size of gravel allowed is 50mm. Backfilling materials shall be placed in horizontal layers not exceeding 25cm thickness and each layer shall be compacted to at least 95% of the maximum dry density.

EXCAVATION

Excavation through the overburden soil can be carried out by conventional equipment such as dozers and JCB.

GENERAL COMMENTS

The recommendations for the foundation design and constructions are based on the information obtained from these two boreholes drilled at site only. When foundation construction is underway, the recommendations of this report should be checked through field inspection for validation. Any variation in the underground conditions revealed by the boreholes should be brought to our attention for alternate recommendations, if needed.

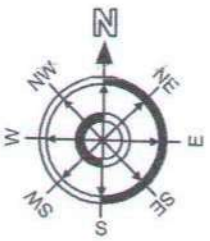
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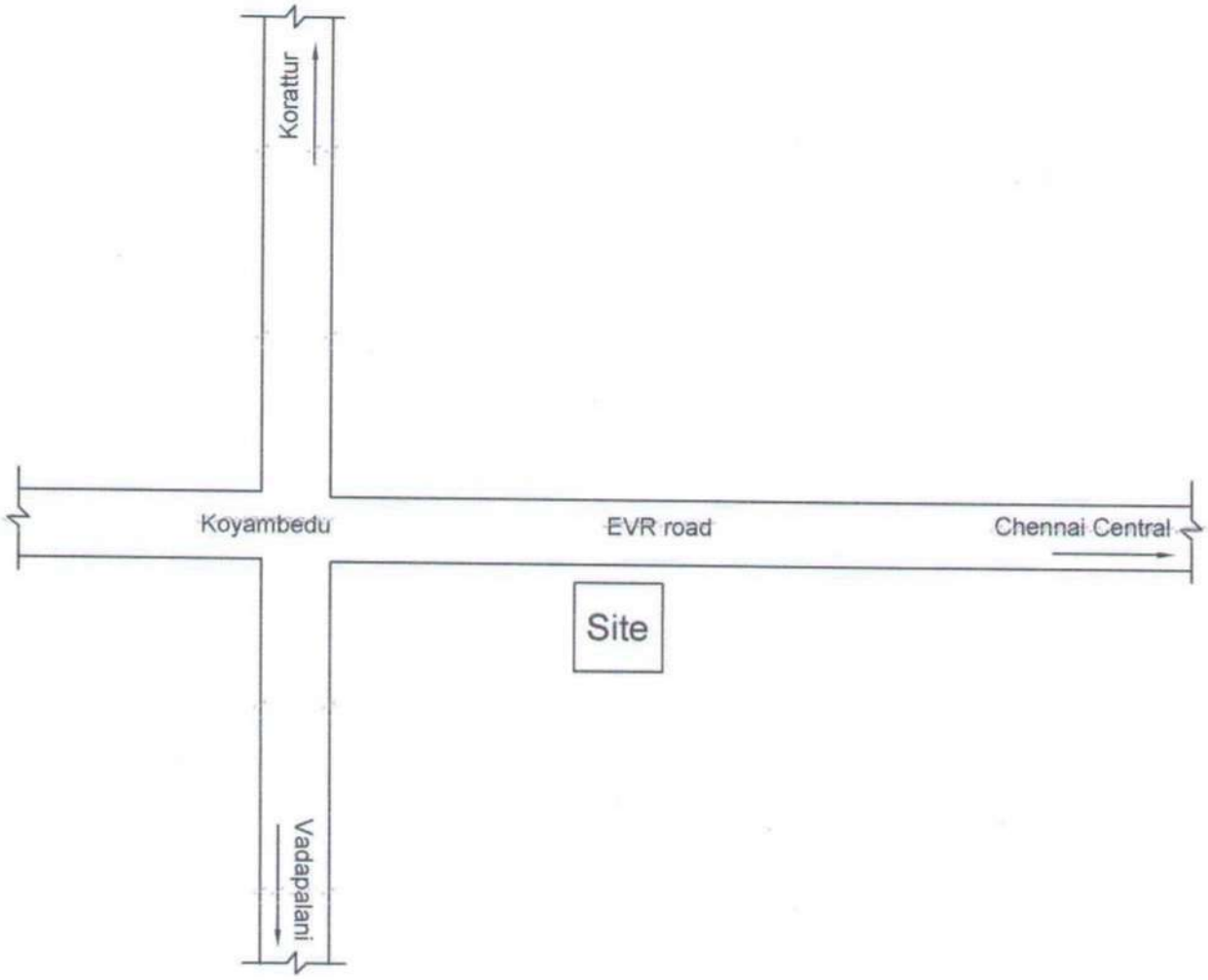
APPENDIX- A

KEY PLAN &
BORE HOLE LOCATION PLAN

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KEY PLAN

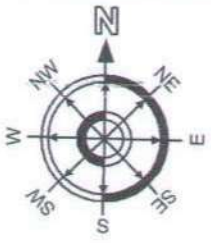


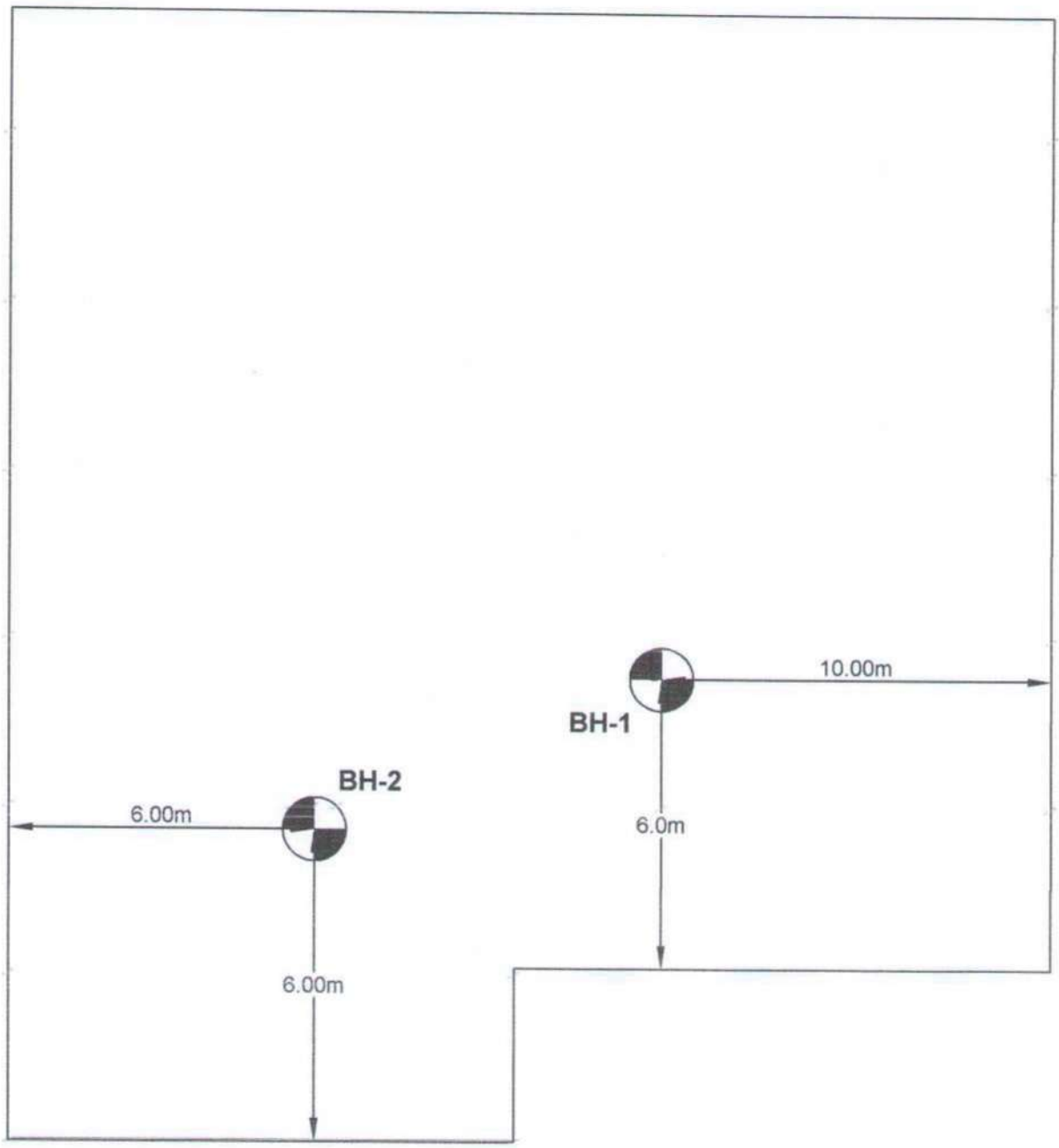


Title : **SITE KEY PLAN**	Client: **M/s. Shri Raman Developers**	
Site : **Poonamallee High road, Aminjikarai, Chennai - 600029**	Scale : NTS	File no : 1
	Date :28.07.2023	Drg no : 1
	Drn by: Berlin	**Report No. JCE/GEOTECH/2023/061**

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BORE HOLE LOCATION





Title : **BORE HOLE LOCATION**	Client: **M/s. Shri Raman Developers**	
Site : **Poonamallee High road, Aminjikarai, Chennai - 600029**	Scale : NTS	File no : 2
	Date :28.07.2023	Drg no : 2
	Drn by: Berlin	**Report No. JCE/GEOTECH/2023/061**

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APPENDIX- B

BORE HOLE LOGS AND CROSS SECTION

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BORE HOLE LOG

Client	: M/s. Shri Raman Developers	**Elevation Of G.L** :	Nil
Project	: Warehouse building	**Water Table** :	Nil
Location	: Stilt+3 Commercial Building	**Type Of Boring** :	Rotary
Bore hole No	: 1	**Dia of Boring** :	100mm
Final Depth	: 3.00m	**Started on** :	21.07.2023
Site Address	: Poonamallee High road, Aminjikarai, Chennai.	**Ended on** :	21.07.2023

Depth (m)	GWL	SYMBOL	DESCRIPTION	SPT COUNT 0 -15 cm	15 -30 cm	30 -45 cm	N- Value	Relative Density /Consistency
0.0								
0.5			Filling (Brown sand)					
1.0								
1.5			Filling (Brown sand)					
2.0								
2.5			Filling (Brown sand)					
3.0								
3.5			Borehole-1 terminated at a depth of 3.00m in filling soil and could not be drilled further due to water loss					
4.0								
4.5								
5.0								
5.5								
6.0								
6.5								
7.0								
7.5								
8.0								
8.5								
9.0								
9.5								
10.0								

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BORE HOLE LOG

Client	: M/s. Shri Raman Developers	Elevation Of G.L	: Nil
Project	: Warehouse building	Water Table	: 6.50m
Location	: Stilt+3 Commercial Building	Type Of Boring	: Rotary
Bore hole No	: 2	Dia of Boring	: 100mm
Final Depth	: 24.00m	Started on	: 21.07.2023
Site Address	: Poonamallee High road, Aminjikarai, Chennai.	Ended on	: 22.07.2023

Depth (m)	GWL	SYMBOL	DESCRIPTION	SPT COUNT 0 -15 cm	15 -30 cm	30 -45 cm	N- Value	Relative Density /Consistency
0.0 – 4.0			Filling (Brown sand) / Filling (Brown sand) / Filling (Brown sand)					
4.0 – 5.0			Brownish poorly graded sand (SP)	10	11	16	27	Medium dense
5.5 – 6.0			Ditto	9	12	19	31	Dense
6.5 – 7.5	GWL		Brownish silty sand (SM)	12	16	21	37	Dense
8.5 – 9.0			Ditto	19	21	20	41	Dense
9.5 – 10.0								

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BORE HOLE LOG

Client	: M/s. Shri Raman Developers	**Elevation Of G.L :**	Nil
Project	: Warehouse building	**Water Table :**	6.50m
Location	: Stilt+3 Commercial Building	**Type Of Boring :**	Rotary
Bore hole No	: 2	**Dia of Boring :**	100mm
Final Depth	: 24.00m	**Started on :**	21.07.2023
Site Address	: Poonamallee High road, Aminjikarai, Chennai.	**Ended on :**	22.07.2023

Depth (m)	GWL	SYMBOL	DESCRIPTION	SPT COUNT 0 -15 cm	15 -30 cm	30 -45 cm	N- Value	Relative Density /Consistency
10.5			Ditto	24	26	30	56	Very dense
11.0								
11.5								
12.0			Ditto	26	20	28	48	Dense
12.5								
13.0								
13.5			Ditto	9	13	15	28	Medium dense
14.0								
14.5								
15.0			Ditto	11	13	17	30	Medium dense
15.5								
16.0								
16.5			Ditto	12	15	16	31	Dense
17.0								
17.5								
18.0			Ditto	50/10cm (P)				Very dense
18.5								
19.0								
19.5								
20.0			Ditto	50/8cm (P)				Very dense

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BORE HOLE LOG

Client	: M/s. Shri Raman Developers	Elevation Of G.L	:	Nil
Project	: Warehouse building	Water Table	:	6.50m
Location	: Stilt+3 Commercial Building	Type Of Boring	:	Rotary
Bore hole No	: 2	Dia of Boring	:	100mm
Final Depth	: 24.00m	Started on	:	21.07.2023
Site Address	: Poonamallee High road, Aminjikarai, Chennai.	Ended on	:	22.07.2023

Depth (m)	GWL	SYMBOL	DESCRIPTION	SPT COUNT 0 -15 cm	15 -30 cm	30 -45 cm	N- Value	Relative Density /Consistency
20.5								
21.0								
21.5								
22.0			Ditto	50/8cm (P)				Very dense
22.5								
23.0								
23.5			Ditto	50/6cm (P)				Very dense
24.0								
24.5			Borehole-2 terminated at a depth of 24.00m in very dense strata					
25.0								
25.5								
26.0								
26.5								
27.0								
27.5								
28.0								
28.5								
29.0								
29.5			Ditto	41	45	49	94	Very dense
30.0								

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CROSS SECTION OF BORE HOLES

Client : M/s. Shri Raman Developers

Project : Stilt + 3 Commercial Building

Location : Aminjikarai

Water Table : 6.5m

Depth (m)	BH-1			BH-2	
	SPT	SYM		SPT	SYM
0.5					
1.0					
1.5					
2.0					
2.5					
3.0					
3.5					
4.0					
4.5				27	
5.0					
5.5					
6.0				31	
6.5			▼		
7.0					
7.5				37	
8.0					
8.5					
9.0				41	
9.5					
10.0					
10.5				56	
11.0					
11.5					
12.0				48	
12.5					
13.0					
13.5				28	
14.0					
14.5					
15.0				30	
15.5					
16.0					
16.5				31	
17.0					
17.5					
18.0				>50	
19.0					
20.0				>50	
21.0					
22.0				>50	
23.0					
24.0				>50	

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APPENDIX- C

LABORATORY TEST RESULTS

PHYSICAL ANALYSIS OF SOIL- BH- 2

DEPTH (M)	W_N %	W_L %	W_P %	I_P %	FSI %	IS	GRAVEL (%)	COARSE SAND (%)	MEDIUM SAND (%)	FINE SAND (%)	SILT+CLAY (%)
4.5	18	Non plastic				SP	0	1	71	24	4
6	18					SP	0	1	69	26	3
7.5	13					SM	0	0	19	55	25
9	12					SM	2	1	24	52	21
10.5	10					SM	0	0	46	39	15
12	14					SM	0	0	19	56	24
14	12					SM	0	0	24	56	20
16	13					SM	0	0	36	45	19
18	22					SM	0	2	35	38	25
19	19					SM	0	2	32	35	31
20	20					SM	0	4	35	38	23
22	21					SM	1	3	30	45	21
24	20					SM	2	3	28	32	35

ABBREVIATION:

W_N = Natural Moisture content (%)

W_L = Liquid limit (%)

W_P = Plasticity Limit (%)

I_P = Plasticity Index (%)

FSI = Free Swell Index (%)

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Correlations of SPT N values with Common properties of soils

A) Granular Soil

Standard Penetration No., SPT N	Description	Relative Density, Dr %	Approx. Angle of Internal Friction, Φ°	Approx. Rang of Most. Unit Wt., ɣ kN/m^3
< 4	Very loose	< 20	< 29	11-16
4-10	Loose	20-40	29-30	14-18
10-30	Medium Dense	40-60	30-36	17-20
30-50	Dense	60-80	36-41	17-22
> 50	Very Dense	> 80	> 41	20-29

B) Cohesive Soil

Standard Penetration No., SPT N	Description	Unconfined Compressive Strength, kPa	Approx. Rang of Most. Unit Wt., , ɣkN/m^3
< 2	Very Soft	0-25	14.4-16
2-4	Soft	25-50	16-17.4
4-8	Firm (medium)	50-100	17.6-19.2
8-15	Stiff	100-200	19.2-20.8
15-30	Very Stiff	200-400	20.8-22.4
> 30	Hard	> 400	> 20

Note: These values are most appropriate values in general. However, the soil properties vary between sites to site and hence it shall be used only for guidance

Keeping Samples:

1. Soil samples will be kept up to 15 days from the date of submission of report.
2. Sample disposal will be carried out for every 15 days.

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APPENDIX- D

PILE FOUNDATION DESIGN CALCULATION

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Client	M/s. Shri Raman Developers
Project	Stilt+3 Commercial Building
Site	Aminjikarai
Pile installation type	Bored cast insitu
Borehole reference	2
Pile diameter	0.6 m
Pile length	16.0 m

1.SKIN RESISTANCE OF PILE

Layer	Strata	Strata top (lvl)	Strata bottom (lvl)	Strata thickness (m)	SPT N	Bulk density (kN/m^3)	Undrained shear strength (kN/m^2)	Adhesion factor	Angle of Internal friction (Φ)	Tan (Φ)	Effective overburden pressure (kN/m2)	Coefficient of earth pressure (K)	Skin resistance (kN)
I	Bronwish poorly graded sand (SP) & Silty sand (SM)	4.5	16	11.5	38	18			32	0.624	46	0.470	292.57
I	Bronwish poorly graded sand (SP) & Silty sand (SM) (Negative skin friction)	1	4.5	3.5	20	18			30	0.577	14	0.500	26.63

2. END BEARING RESISTANCE OF PILE

Layer	Strata	Diameter of pile (m)	Cross sectional area of pile (Ap) (m^2)	R.L of bottom of pile (m)	SPT N	Undrained shear strength (pile tip) (kN/m^2)	Bearing capacity factor (Nc)	Angle of Internal friction (Φ)	Effective height (m)	Bulk unit weight (kN/m^2)	Effective overburden pressure (Pile toe) (kN/m2)	Bearing capacity factor (Nq)	End bearing resistance (kN)
I	Brownish silty sand (SM)	0.6	0.283	16.0	50			34	9	18	72	40	814.30

Ultimate Load Carrying Capacity (Qs+Qp)		1080.24 kN
Safe Load Carrying Capacity (Qsafe =Qu/2.5)		**432.09** kN
	Say	**430** kN
Lateral Load Bearing Capacity		**34.4** kN
Ultimate uplift resistance		265.93 kN
Safe Uplift resistance		**106.37** kN
	Say	

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Client	M/s. Shri Raman Developers
Project	Stilt+3 Commercial Building
Site	Aminjikarai
Pile installation type	Bored cast insitu
Borehole reference	2
Pile diameter	0.75 m
Pile length	16.0 m

1.SKIN RESISTANCE OF PILE

Layer	Strata	Strata top (lvl)	Strata bottom (lvl)	Strata thickness (m)	SPT N	Bulk density (kN/m^3)	Undrained shear strength (kN/m^2)	Adhesion factor	Angle of Internal friction (Φ)	Tan (Φ)	Effective overburden pressure (kN/m2)	Coefficient of earth pressure (K)	Skin resistance (kN)
I	Bronwish poorly graded sand (SP) & Silty sand (SM)	4.5	16	11.5	38	18			32	0.624	46	0.470	365.71
I	Bronwish poorly graded sand (SP) & Silty sand (SM) (Negative skin friction)	1	4.5	3.5	20	18			30	0.577	14	0.500	33.29

2. END BEARING RESISTANCE OF PILE

Layer	Strata	Diameter of pile (m)	Cross sectional area of pile (Ap) (m^2)	R.L of bottom of pile (m)	SPT N	Undrained shear strength (pile tip) (kN/m^2)	Bearing capacity factor (Nc)	Angle of Internal friction (Φ)	Effective height (m)	Bulk unit weight (kN/m^2)	Effective overburden pressure (Pile toe) (kN/m2)	Bearing capacity factor (Nq)	End bearing resistance (kN)
I	Brownish silty sand (SM)	0.75	0.442	16.0	50			34	11.25	18	90	40	1590.44

Ultimate Load Carrying Capacity (Qs+Qp)		1922.85 kN
Safe Load Carrying Capacity (Qsafe =Qu/2.5)		**769.14** kN
	Say	**760** kN
Lateral Load Bearing Capacity		**60.8** kN
Ultimate uplift resistance		332.42 kN
Safe Uplift resistance		**132.97** kN
	Say	**130** kN

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Client	M/s. Shri Raman Developers
Project	Stilt+3 Commercial Building
Site	Aminjikarai
Pile installation type	Bored cast insitu
Borehole reference	2
Pile diameter	1 m
Pile length	16.0 m

1.SKIN RESISTANCE OF PILE

Layer	Strata	Strata top (lvl)	Strata bottom (lvl)	Strata thickness (m)	SPT N	Bulk density (kN/m^3)	Undrained shear strength (kN/m^2)	Adhesion factor	Angle of Internal friction (Φ)	Tan (Φ)	Effective overburden pressure (kN/m2)	Coefficient of earth pressure (K)	Skin resistance (kN)
I	Bronwish poorly graded sand (SP) & Silty sand (SM)	4.5	16	11.5	38	18			32	0.624	46	0.470	487.61
I	Bronwish poorly graded sand (SP) & Silty sand (SM) (Negative skin friction)	1	4.5	3.5	20	18			30	0.577	14	0.500	44.39

2. END BEARING RESISTANCE OF PILE

Layer	Strata	Diameter of pile (m)	Cross sectional area of pile (Ap) (m^2)	R.L of bottom of pile (m)	SPT N	Undrained shear strength (pile tip) (kN/m^2)	Bearing capacity factor (Nc)	Angle of Internal friction (Φ)	Effective height (m)	Bulk unit weight (kN/m^2)	Effective overburden pressure (Pile toe) (kN/m2)	Bearing capacity factor (Nq)	End bearing resistance (kN)
I	Brownish silty sand (SM)	1	0.785	16.0	50			34	11.5	18	92	40	2890.27

Ultimate Load Carrying Capacity (Qs+Qp)		3333.49 kN
Safe Load Carrying Capacity (Qsafe =Qu/2.5)		**1333.40** kN
	Say	**1330** kN
Lateral Load Bearing Capacity		**106.4** kN
Ultimate uplift resistance		443.22 kN
Safe Uplift resistance		**177.29** kN
	Say	**170** kN

JOSMAR CONSULTING ENGINEERS CHENNAI-42



our services doesn't just end there

Buying & Selling Services

Property Buying Assistance, Property Selling Support, Market Price Analysis, Owner Outreach and Negotiation.

Legal & Documentation Services

Certified EC, Patta, legal opinions, property verification, due diligence, litigation solutions, and legal heir certificates.

Property Development & Approvals

Building plan approvals, construction, layout and sub-division approvals, zone conversion, and occupancy certification.

NRI & Investment Services

Escrow Services, Rentals, Litigation Solutions, Property Valuation and Property Management

Compliance & Special Services

Demolition, Vaasthu checks, regularization of unauthorized buildings, and office space solutions.



empowering your real estate decisions with smart tools

Property Valuation & Cost Estimation

Guideline Value, Apartment Composite Value, Stamp Duty & Registration Fees Calculator, Building Value Calculator, Capital Gains Calculator, Area Unit Converter, Length Unit Converter

Ownership, Compliance & Legal Verification

Encumbrance Certificate (EC) Search, Find Your SRO, Temple Property Check, WAQF Property Check, View Patta/Chitta, View FMB, Patta Analyzer, EC Analyzer

Zoning & Land Use Analysis

Land Use Zone Finder, CRZ Zone Check, Aquifer Zone Check, CBA Check, EWS Check, Road Width Check, Proposed Road Widening Check, FSI Calculator

Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary

Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management

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