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NAME OF PROJECT

SOIL INVESTIGATION FOR THE PROPOSED PROJECT AT KARAPAKKAM, OLD MAHABALIPURAM ROAD, CHENNAI, TAMILNADU.

At SURVEY NOS 166/1A,166/1B,166/2,166/3A,166/3B,166/4A,166/4B,166/5A,166/5B,166/15A1

CLIENT

M/s. SANGHVI & DOSHI ENTERPRISE,
Chennai.

GEOTECHNICAL CONSULTANT

GEO FOUNDATIONS & STRUCTURES PVT LTD,
No.89, 1ST MAIN ROAD, GANDHI NAGAR,
ADYAR, CHENNAI - 600 020

PROJECT No.: 21-990					
Rev. No.	**Date**	**Description**	**Created by**	**Verified by**	**Approved by**
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SOIL INVESTIGATION REPORT

1.0 INTRODUCTION

1.1 The work of "Soil Investigation for the Proposed Project at Karapakkam, Old Mahabalipuram Road, Chennai, Tamilnadu." was entrusted to **M/s. Geo Foundations and Structures (P) Ltd., Adyar, Chennai – 600 020**, by **M/s. Sanghvi & Doshi Enterprise, Chennai.**

1.2 The soil investigation works (field Investigation) were carried out during **November 2021.** This report summarizes the results of the soil investigation, and presents recommendations for suitable type of foundations for the proposed structures.

2.0 OBJECTIVE OF INVESTIGATION

2.1 The objective of soil investigation is to determine the nature and characteristics of sub-soil below the ground level for the proposed structures. The study includes identification of suitable type of foundations and assessment of safe bearing capacities for the proposed structures.

3.0 SCOPE OF WORK

The scope of work at this site comprises of the following:

3.1 Mobilization of Calyx drilling machine with all necessary equipments and personnel.

3.2 Boring of **17** bore holes of 150 mm diameter with Calyx drilling equipments through sand, silt, clay & up to hard strata below the ground level.

3.3 Conducting Standard Penetration Tests in the bore holes and collecting the disturbed but representative soil samples, including packing and transportation to laboratory.

3.4 Conducting 7 no"s of Packer Permeability Test.

3.5 To conduct the following laboratory tests on soil samples, which are applicable to the type of soil to be tested.

(a) Grain size analysis

(b) Index properties:

(i) Liquid limit

(ii) Plastic limit

(c) Moisture content

(d) Dry and bulk density

(e) Specific Gravity

(f) Free Swell Index

(g) Triaxial / Direct Shear Test

(h) Chemical Analysis of Ground Water and Soil.

3.5.1 To conduct the following laboratory tests on rock samples:

(a) Porosity

(b) Dry Density

(c) Unconfined Compressive Strength (Soaked)

3.6 Preparation and submission of detailed report of field and laboratory results with recommendations for suitable type of foundations.

4.0 FIELD INVESTIGATIONS-GEO-TECHNICAL STUDIES

4.1 Boring rigs, with all requisite equipments and accessories, were mobilized at the worksite. A team of technical personnel with skilled laborers were also deputed.

4.2 **Seventeen** bore holes of 150 mm diameter were bored to a maximum depth up to **20 m** below the existing ground level. The bore holes were made as per relevant Indian Standard IS: 1892: 2021.

4.3 Representative soil samples were collected at every change of strata or at about 1.5 m depth interval, up to 15 m, from the existing ground level, followed by 0.5 m

depth interval, up to termination depth. The samples so collected were sealed and numbered with full particulars for identification and sent to the laboratory for conducting the required tests.

4.4 Standard Penetration tests were conducted in the bore holes at 1.5 m depth interval, up to 5 m, from the existing ground level, followed by 0.5 m depth interval, up to termination depth, as per the relevant Indian Standard, IS: 2131-1981(Reaffirmed 2021). In this test, a standard split spoon sampler is driven into the ground at the required depth by means of standard hammer of 63.5 kgs weight, falling from a height of 75 cm. Number of blows for the first 15 cm is not taken into consideration because of possible disturbances or presence of settled, suspended matters at the bottom of the bore- holes. The total number of blows for the next 30 cm depth of penetration is considered as SPT „N" value as shown in Figure nos. 01 to 17 **(Appendix I).**

5.0 LABORATORY INVESTIGATION

The following laboratory tests were conducted on the selected soil & rock samples collected from the bore holes:

(a) Grain size analysis & Hydrometer Analysis

(b) Index properties on clayey and silty soil samples:

  (i) Liquid limit

  (ii) Plastic limit

(c) Natural Moisture content

(d) Dry and bulk density

(e) Specific Gravity

(f) Direct Shear Test

(g) Triaxial Test

(h) Unconfined Compressive Strength

(i) Chemical Analysis of Soil

For rock samples:

(a) Porosity

(b) Dry Density

(c) Point Load Index

(d) Unconfined Compressive Strength (Soaked)

All the above laboratory tests were carried out as per relevant Indian Standards.

All the soil samples were identified and classified as per relevant Indian Standard, IS: 1498-1970(Reaffirmed 2021).The results are shown in Table Nos.1 to 17 **(Appendix II).**

The results of the chemical analysis of ground water are presented in Table No.18 **(Appendix III).**

6.0 SOIL PROFILE

The borelogs details of subsoil strata for the boreholes are given below

The sub soil consists of soft to very stiff silty clay/sandy silty clay/clay of medium to high plasticity up to 4.5 m, followed by mostly medium dense to very dense silty sand/ clayey sand/gravelly silty sand/gravelly sand/clayey silty sand and medium stiff sandy silty clay/silty clay/clay of medium to high plasticity up to 15 m, followed by jointed rock, up to 20 m, at which the boreholes were terminated.

7.0 GROUND WATER TABLE

Ground water levels were met at a depth ranging from **0.3 m to 0.5 m** from the existing ground level at the time of investigation in all the 17 boreholes, during continuous boring from **09.10.2021 to 01.11.2021.**

8.0 RECOMMENDATIONS FOR SUITABLE TYPE OF FOUNDATIONS:

Bore holes were made for soil investigation to assess the nature and strength of the subsoil strata for sustainability of the loads. This report gives the details of the soil strata, suitable type of foundations and safe bearing capacity. Based on the subsoil

conditions described in Sl. No. 6, obtained very low SPT N values varying from 2 to 9 at some depths between 1.5 m to 10.5 m, from below the existing ground level. Hence, open foundations are not feasible for heavily loaded structures. Since the total and differential settlements will be very large, pile foundations are recommended for very sensitive and heavily loaded structures.

Guide lines for fill materials and for filling. If it is proposed to raise the ground level by filling, guidelines are given in **Enclosure – 2.**

8.1 For Multistoried Structures (Stilt+13 Floors) or (Stilt+19 Floors): Boreholes BH 1 to BH 14

8.1.1 <u>Pile Foundations</u> (For Very Sensitive and Heavy Loaded Structures)

- Bored cast in situ concrete pile foundations are recommended.
- The recommended safe load carrying capacity of bored cast in situ concrete piles are considered as per IS 2911 (Part 1/Sec2): 2010 (Reaffirmed 2020)
- The pile bore may be terminated at a depth of minimum three times diameter of the pile in to hard strata (where four consecutive SPT „N" values of more than 100 are obtained in each test at depth intervals of one pile diameter).
- To satisfy the above criterion, the pile length may be of the order of **13.5 m to 15 m** from the existing ground level.
- In terms of concrete used for the piles, to provide the required factor of safety of **2.5** for stress in the pile concrete, we recommend minimum M 30 Grade Concrete.
- According to the structural strength of concrete determined for different pile diameters, assuming 5 grades less to allow for underwater concreting, consider M 25 grade concrete instead of M 30 grade concrete.
- The recommended safe load carrying capacity of bored cast in situ concrete piles as per IS 2911 (Part 1/Sec2): 2010 (Reaffirmed 2020) for different pile diameters are presented in **Table A.**

Table A

Approximate Length of Pile from G.L (m)	Pile Diameter (mm)	Recommended Safe Vertical Pile Load Capacity (T)
13.5 to 15	450	75
	500	100
	600	135
	750	190
	900	240

8.1.2 R.C.C. BORED CAST IN SITU PILES

Safe capacity of RCC Bored cast-in-situ pile can be computed by using the formula given in IS: 2911 (Part-1/Sec-2):2010 (Reaffirmed 2020)

Ultimate bearing capacity Qu of piles in Cohesionless soil:

$$Qu = A_p(0.5.D.\gamma.N\gamma + P_D.N_q) + \sum_{I=1}^{I=n} K .P_{Di}.\tan \delta.A_{si}$$

Where, A_p = Cross sectional area of pile toe in cm²

D= Stem dia. in cm

γ= Effective unit weight of soil at pile toe in kg /cm³

P_D = Effective overburden pressure in kg / cm²

$N\gamma$ and Nq = Bearing capacity factors depending upon the angle of internal friction Ø at toe

$\sum_{i=1}^{i=n}$ = Summation of N layers in which pile is installed

K = Coefficient of earth pressure

P_{Di} = Effective overburden pressure in kg /cm² for the i^{th} layer where i varies from 1 to n.

δ= Angle of wall friction between pile and soil in degrees (may be taken equal to Ø)

A_{si} =Surface area of pile stem in cm² in the i^{th} layer where i varies from 1 to n.

For cohesive soil:-

Safe capacity of pile = $1/f \{A_P. Nc. Cp+\alpha. C.A_S)$

Where,

A_p- c/s area of pile toe in cm²

Nc- bearing capacity factor

Cp- average cohesion at pile tip in kg/cm²

α - Reduction factor

C – average cohesion throughout the length of pile in kg/cm²

A_S- Surface area of pile shaft in cm²

f - factor of safety.

8.2 For Podium Area: Boreholes BH 15

8.2.1 Alternative I : Under Reamed Pile Foundations

- Since mostly soft to stiff clay of high plasticity occurs in the bore holes in the top layers, the length of the under-reamed piles and the recommended safe load carrying capacities for under-reamed piles of single under reamed are presented in **Table B** respectively.

8.2.1.1 For Single Under-reamed:

Table-B

Approximate length of the pile (m)	Shaft Diameter (mm)	Under-reamed Diameter (mm)	Safe capacity as per IS: 2911 (Part III) Compression (T)
5	375	940	36
	400	1000	42
	450	1125	61

- At least M 20 grade concrete is recommended for the under-reamed piles. All other requirements given in IS: 2911 (Part-III) shall be complied with.
- It is desirable to use a pile group (of at least two piles in the group) under each column, so that any inadvertent eccentricity between the piles and the columns will be taken care by the pile group as axial compression or axial upward force. The minimum spacing in a pile group (centre to centre of piles) shall not be less than one and a half times the under-reamed diameter, as stipulated in IS: 2911(Part III), latest Edition, Clause-5.2.7.2.
- In case a single pile is adopted for a column, the column shall be grown over the pile, in order to avoid any eccentric loading on the pile.
- It is necessary that an experienced contractor executes the under-reamed piles with proven ability in installing under-reamed piles. It is recommended that at least one initial test pile is installed and tested for the purpose of evaluating the ability of the contractor to install proper under-reamed piles and also to determine the actual capacity of the pile for vertical load.
- After the initial test pile is load-tested, and the results analyzed, regular piles (working piles) may be installed. At least one working pile shall be load-tested (routine pile load test).

8.2.1.1.1 Load Test on Piles

- The initial pile load test and the routine pile load test shall be carried out as per guidelines given in Indian Standard, IS: 2911(Part-4)-2013 "Code of practice for design and construction of pile foundations, Part-4: Load test on piles".
- The initial pile load test shall be carried out up to a "test load" of at least two times the estimated safe load, preferably up to two and a half times the estimated safe load. The routine pile load test on working pile shall be carried out up to either a "test load" of one and a half times the design safe load or up to a

settlement of 12 mm for pile diameter up to and including 600 mm whichever occurs first.

8.2.2 Alternative II: Pile Foundations (For Very Sensitive and Heavy Loaded Structures)

- Bored cast in situ concrete pile foundations are recommended.
- The recommended safe load carrying capacity of bored cast in situ concrete piles are considered as per IS 2911 (Part 1/Sec2): 2010 (Reaffirmed 2020)
- The pile bore may be terminated at a depth of minimum three times diameter of the pile in to hard strata (where four consecutive SPT „N" values of more than 100 are obtained in each test at depth intervals of one pile diameter).
- To satisfy the above criterion, the pile length may be of the order of **13.5 m to 15 m** from the existing ground level.
- In terms of concrete used for the piles, to provide the required factor of safety of **2.5** for stress in the pile concrete, we recommend minimum M 30 Grade Concrete.
- According to the structural strength of concrete determined for different pile diameters, assuming 5 grades less to allow for underwater concreting, consider M 25 grade concrete instead of M 30 grade concrete.
- The recommended safe load carrying capacity of bored cast in situ concrete piles as per IS 2911 (Part 1/Sec2): 2010 (Reaffirmed 2020) for different pile diameters are presented in **Table C.**

Table C

Approximate Length of Pile from G.L (m)	Pile Diameter (mm)	Recommended Safe Vertical Pile Load Capacity (T)
15	450	75
	500	100
	600	135
	750	190

	900	240

8.3 For Structure Club House (S+G+2 Floors): Boreholes BH 16 and BH 17

8.3.1 <u>Alternative I</u>: Open Foundations (For lightly loaded structures)

- Open Foundations (individual column footings) are recommended.
- Excavation shall be made up to a depth of at least **5 m** below the ground level which existed at the time of soil investigation for all foundations, irrespective of the importance of the column or the loading on the column.
- After thorough compaction of the bottom of excavation, a layer of clean river sand or M-sand, 150 mm thickness, mixed with powder dry shell lime (with available Calcium Oxide being not less than 60% and the amount of powder dry shell lime being 20 % by volume of the sand) shall then be laid. The sand cushion layers shall be at least 225 mm wider on each of the two sides of strip raft, or on all four sides of the Individual column footings or combined footing or Raft foundation. The sand cushion layer shall be watered and well compacted.
- The lime powder shall be mixed with the sand just before placing it on the compacted bottom of excavation.
- The addition of powder dry shell lime in the sand is intended to reduce the plasticity of the underlying silty clay or sandy clay, which in turn will reduce the shrinkage and swelling effects of the underlying silty clay or sandy clay. The Addition of lime powder also helps to improve the strength of the silty clay or sandy clay.
- PCC for the foundations can then be laid on the compacted sand cushion layer at **4.7 m** depth from existing ground level.
- A safe bearing capacity of **15 t/m²** is recommended under the foundations. However, the width of any column footing or strip raft shall not be less than 1 m.
- At the time of excavation for foundations, if ground water table occurs within the recommended depth of excavation, sumps may be made to an additional depth of

0.3 m at one or more corners of the foundation pits for column footings/combined footings or at desired locations along the periphery of excavation for strip raft/raft foundation, and the water collected in the sumps may be bailed out. At the time of laying the sand cushion layer, the bottom of excavation shall be relatively dry (not slushy). Dewatering shall be maintained until that part of the concrete in the foundations, which comes below the ground water table level, sets.

8.3.2 Alternative II: Pile Foundations (For Very Sensitive and Heavy Loaded Structures)

- Bored cast in situ concrete pile foundations are recommended.
- The recommended safe load carrying capacity of bored cast in situ concrete piles are considered as per IS 2911 (Part 1/Sec2): 2010 (Reaffirmed 2020)
- The pile bore may be terminated at a depth of minimum three times diameter of the pile in to hard strata (where four consecutive SPT „N" values of more than 100 are obtained in each test at depth intervals of one pile diameter).
- To satisfy the above criterion, the pile length may be of the order of **13.5 m to 15 m** from the existing ground level.
- In terms of concrete used for the piles, to provide the required factor of safety of **2.5** for stress in the pile concrete, we recommend minimum M 30 Grade Concrete.
- According to the structural strength of concrete determined for different pile diameters, assuming 5 grades less to allow for underwater concreting, consider M 25 grade concrete instead of M 30 grade concrete.
- The recommended safe load carrying capacity of bored cast in situ concrete piles as per IS 2911 (Part 1/Sec2): 2010 (Reaffirmed 2020) for different pile diameters are presented in **Table D.**

Table D

Approximate Length of Pile from G.L (m)	Pile Diameter (mm)	Recommended Safe Vertical Load Capacity (T)
13.5 to 15	500	110
	600	140
	750	200
	900	250

9.0 The results given in this report are based on the results of the soil investigation carried out. In actual execution, if any variation is found, the consultants may also be referred to.

APPROVED BY,

For GEO FOUNDATIONS & STRUCTURES PVT.LTD.

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Anala Suresh Kumar, M.Tech (Geo technical)**,M.B.A**(T.M)
General Manager(Geo Technical)

Enclosure – 1

List of some of the Good Sources of Lime with CaO more than 50%

1. P. G. Elumalai Nayagar & Sons
   Plot No. 11, Chunnambu Kalavai Road
   Korukkupet, Chennai-600 021
   9444031551

2. Shri. Krishnamoorthy
   Sree Srinivasa Agencies
   No. 1, Ekambara Naicker Industrial Estate
   Arcot Road, Alapakkam
   Chennai 600 116
   9444 28 3828, 94441 57703

3. KAYCEE INDUSTRIAL CHEMICALS Pvt.Ltd
   111 / 33, E - 1, Main Road, State Bank Colony,
   Tuticorin - 628002
   Phone: 0461-2347908 Fax: 0461-2348247

Tests to be conducted on lime powder:

1. Total Calcium oxide as CaO
2. Available calcium oxide as CaO
3. Loss on ignition @ 1000 Deg. C

List of some of the laboratories for chemical analysis of lime powder

Italab Private Ltd., New No. 194 (Old No. 149) Govindappa Naicken Street, Chennai-600 001	Ph: 2536 9479 Tele Fax: 044 – 2536 9327 **Contact Person: Shri. Subramanian**
SGS India Pvt Ltd., 1/509 A, Old Mahabalipuram Road, Thoraipakkam, Chennai-600 097	Phone: 2496 3844 / 2496 2822 Fax: 2496 3075
VNS Laboratories of India No. 1/134, Ethirajulu Street, Madipakkam, Chennai-600 091	Phone: 22582010 / 22582934 Cell: 9382120695 Fax: 22580003 Email: vnslb@fy.com

Enclosure-2

GUIDELINES FOR FILL MATERIAL AND FOR FILLING / BACK FILLING

Relatively inert material such as sand or gravel shall be used for filling / back filling. The percentage of fines (grain size less than 0.075 mm) shall not exceed 20%. The liquid limit shall not exceed 30 % and the plasticity index shall not exceed 10 %. The fill material shall be free from contamination from decomposed organic matter and harmful chemicals.

Filling shall be done in layers of not more than 150 mm thickness, each layer.

Each layer shall be well compacted at about the optimum moisture content of the fill soil. Compaction may be monitored by taking field density measurements at the rate of at least one test for every 750 square metres * of area compacted. At least 95% of the maximum dry density obtained in the laboratory Standard Proctor compaction test (as per IS: 2720, Part VII-1980, Methods of test for soils, Determination of water content-dry density relation using light compaction, Second Revision) shall be achieved in the field.

***** Reference: Handbook of Quality control for construction of roads and runways, second revision, Indian Roads Congress, Special Publication – 11, Pages 18 & 19, Tables 2.1 & 2.2

Table 2.1 Control Tests on Borrow Materials

S. No	*Test*	*Test Method*	*Minimum desirable frequency*
1.	Gradation@ / Sand-content	IS : 2720 Part IV-1985(RA 2020)	1-2 tests per 8000 m^3 of soil
2.	Plasticity index	IS : 2720 Part V-1985 (RA 2020)	-do-
3.	Standard Proctor Test	IS : 2720 Part VII-1980 (RA 2016)	-do-
4.	CBR on a set of 3 specimens **	IS : 2720 Part XVI-1987 (RA 2016)	One test per 3000 m^3
5.	Deleterious constituents	IS : 2720 Part XXVII-1977(RA 2006)	As required

6.	Natural moisture content	IS : 2720 Part II – 1973 Second Revision (RA 2020)	One test per 250 m^3 of soil

@ If specifications call for such tests.
** For purposes of design only, unless otherwise specified.

Table 2.2 Tests for Compaction Control

S. No	*Test*	*Test Method*	*Minimum desirable frequency*
1.	Moisture content just before compaction	IS : 2720 Part II-1973 Second Revision (RA 2020)	2-3 tests per 250 m^3 of loose soil
2.	Dry density of compacted layer	IS : 2720 Part XXVIII-1974 (RA 2010)	Generally, one test per 1000 m^2 of compacted area for the body of the embankment, to be increased to one test per 500-1000 m^2 of compacted area for top sub grade layers, i.e., top 500 mm portion of the embankment.

APPENDIX- I

BORE LOGS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

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Bore Hole No	**: BH 1**
Location	**: Karapakkam**
Type of Boring	**: Calyx**
Ground Water Level	**: 0.3 m from G.L on 19.10.2021**
Termination Depth	**: 17.50 m**

Drilling Hole Record-BH 1

Fig No. 01

Reduced Level	**:**	**98.25**
Start Date	**:**	**17.10.2021**
End Date	**:**	**18.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Sandy **CLAY** (CH)	Brown	Soft, Layered				SPT-1	SS	1.50	1.50-1.95	1	1	2	3				G.W.L
						UDS-1	OT	3.00	3.00-3.45	-	-	-	-				
			4.50	93.75		SPT-2	SS	4.50	4.50-4.95	2	2	3	5				
	Brown & Grey	Medium Stiff, Layered	6.00	92.25		SPT-3	SS	6.00	6.00-6.45	2	3	4	7				
CLAY (CH)	Brown & Grey	Medium Stiff, Layered	7.50	90.75		SPT-4	SS	7.50	7.50-7.95	4	4	6	10				
	Grey	Stiff, Layered	9.00	89.25		SPT-5	SS	9.00	9.00-9.45	5	5	7	12				
Sandy **CLAY** (CH)	Brown	Stiff, Layered	10.50	87.75		SPT-6	SS	10.50	10.50-10.95	5	6	7	13				
CLAY (CH)	Brown	Stiff, Layered															

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.3 m from G.L on 19.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

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Bore Hole No	**: BH 1**	**Drilling Hole Record-BH 1**	
Location	**: Karapakkam**	**Fig No. 01**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.25**
Ground Water Level	**: 0.3 m from G.L on 19.10.2021**	**Start Date**	**: 17.10.2021**
Termination Depth	**: 17.50 m**	**End Date**	**: 18.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Brownish,Stiff, **CLAY** (CH)			12.00	86.25		SPT-7	SS	12.00	12.00-12.45	8	14	21	35				G.W.L
CLAY (CH)	Brown	Hard, Layered	13.50	84.75		SPT-8	SS	13.50	13.50-13.75	30	>50	-	>100				50/10 cm penetration
Weathered Rock			16.50	81.75		SPT-9 CR-1	SS CS	15.00	15.00-15.07 15.07-16.50	>50 -	- -	- -	>100 -				50/07 cm penetration
Jointed Rock			17.50	80.75		CR-2	CS	16.50	16.50-17.50	-	-	-	-		25	Nil	

G.W.L: 0.3 m from G.L on 19.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

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Bore Hole No	**: BH 2**	**Drilling Hole Record-BH 2**	
Location	**: Karapakkam**	**Fig No. 02**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.27**
Ground Water Level	**: 0.3 m from G.L on 21.10.2021**	**Start Date**	**: 19.10.2021**
Termination Depth	**: 18.50 m**	**End Date**	**: 20.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Silty **CLAY** (CH)	Brown	Soft, Layered				SPT-1	SS	1.50	1.50-1.95	1	1	2	3				G.W.L
						UDS-1	OT	3.00	3.00-3.45	-	-	-	-				
			4.50	93.77		SPT-2	SS	4.50	4.50-4.95	1	3	3	6				
	Grey	Stiff, Layered	6.00	92.27		SPT-3	SS	6.00	6.00-6.45	4	6	6	12				
Silty **SAND** (SM)	Brown	Medium Dense, Granular	9.00	89.27		SPT-4	SS	7.50	7.50-7.95	6	7	9	16				
						SPT-5	SS	9.00	9.00-9.45	4	5	7	12				
Sandy **CLAY**	Grey	Stiff, Layered	10.50	87.77		SPT-6	SS	10.50	10.50-10.95	5	7	7	14				
CLAY (CH)	Brown	Stiff, Layered															

G.W.L: 0.3 m from G.L on 21.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 2**	**Drilling Hole Record-BH 2**	
Location	**: Karapakkam**	**Fig No. 02**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.27**
Ground Water Level	**: 0.3 m from G.L on 21.10.2021**	**Start Date**	**: 19.10.2021**
Termination Depth	**: 18.50 m**	**End Date**	**: 20.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Brownish,Stiff, **CLAY** (CH)			12.00	86.27		SPT-7	SS	12.00	12.00-12.45	7	9	11	20				G.W.L
Silty **SAND** (SM)	Brown	Medium Dense, Granular	13.50	84.77		SPT-8	SS	13.50	13.50-13.75	40	>50	-	>100				50/10 cm penetration
Weathered Rock						SPT-9	SS		15.00-15.22	50	>50	-	>100				50/07 cm penetration
						CR-1	CS	15.00	15.22-16.50	-	-	-	-				
						CR-2	CS	16.50	16.50-17.50	-	-	-	-				
			17.50	80.77		CR-3	CS	17.50	17.50-18.50	-	-	-	-		35	20	
Jointed Rock				79.77													

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.3 m from G.L on 21.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 3
Location	: Karapakkam
Type of Boring	: Calyx
Ground Water Level	: 0.4 m from G.L on 23.10.2021
Termination Depth	: 18.00 m

Drilling Hole Record-BH 3

Fig No. 03

Reduced Level	:	98.22
Start Date	:	21.10.2021
End Date	:	22.10.2021

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Sandy Silty **CLAY** (CI)	Brown & Grey	Soft, Layered				SPT-1	SS	1.50	1.50-1.95	1	2	2	4				G.W.L
			3.00	95.22		UDS-1	OT	3.00	3.00-3.45	-	-	-	-				
Brownish & Greyish, Silty **CLAY** (CI)			4.50	93.72		SPT-2	SS	4.50	4.50-4.95	7	8	12	20				
Silty **SAND** (SM)	Grey	Medium Dense, Granular	6.00	92.22		SPT-3	SS	6.00	6.00-6.45	18	20	23	43				
		Dense, Granular	7.50	90.72		SPT-4	SS	7.50	7.50-7.95	5	8	13	21				
Sandy Silty **CLAY** (CI)	Brown	Very Stiff, Layered	9.00	89.22		SPT-5	SS	9.00	9.00-9.45	3	5	7	12				
Silty **CLAY** (CH)	Grey	Stiff, Layered				SPT-6	SS	10.50	10.50-10.95	3	7	9	15				

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.4 m from G.L on 22.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 3**	**Drilling Hole Record-BH 3**	
Location	**: Karapakkam**	**Fig No. 03**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.22**
Ground Water Level	**: 0.4 m from G.L on 23.10.2021**	**Start Date**	**: 21.10.2021**
Termination Depth	**: 18.00 m**	**End Date**	**: 22.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Brownish,Stiff, Silty **CLAY** (CH)			12.00	86.22		SPT-7	SS	12.00	12.00-12.45	9	15	9	24				
Silty **CLAY** (CL)	Brown	Very Stiff, Layered	13.50	84.72		SPT-8	SS	13.50	13.50-13.90	25	30	>50	>100				50/10 cm penetration
Weathered Rock			15.50	82.72		SPT-9	SS	15.00	15.00-15.10	>50	-	-	>100				50/10 cm penetration
Jointed Rock			18.00	81.22		CR-1	CS	15.50	15.50-17.00	-	-	-	-		22	Nil	
						CR-2	CS	17.00	17.00-18.00	-	-	-	-		30	18	

G.W.L: 0.4 m from G.L on 22.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 4
Location	: Karapakkam
Type of Boring	: Calyx
Ground Water Level	: 0.35 m from G.L on 25.10.2021
Termination Depth	: 18.00 m

Drilling Hole Record-BH 4

Fig No. 04

Reduced Level	:	98.28
Start Date	:	23.10.2021
End Date	:	24.10.2021

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE 20 40 60 80 100	C.R (%)	R.Q.D(%)	REMARKS
Sandy Silty **CLAY** (CH)	Brown & Grey	Soft, Layered				SPT-1	SS	1.50	1.50-1.95	1	1	2	3				G.W.L
			3.00	95.28		UDS-1	OT	3.00	3.00-3.45	-	-	-	-				
Brownish & Greyish, **CLAY** (CI)			4.50	93.78		SPT-2	SS	4.50	4.50-4.95	1	2	8	10				
Silty **SAND** (SM)	Grey	Loose, Granular	6.00	92.28		SPT-3	SS	6.00	6.00-6.45	7	12	15	27				
		Medium Dense, Granular	7.50	90.78		SPT-4	SS	7.50	7.50-7.95	5	6	8	14				
Sandy **SILT** (ML)	Brown	Medium Dense, Granular	9.00	89.28		SPT-5	SS	9.00	9.00-9.45	6	7	9	16				
Silty **CLAY** (CH)	Grey	Very Stiff, Layered	10.50	87.78		SPT-6	SS	10.50	10.50-10.95	4	4	5	9				
		Stiff, Layered															

G.W.L: 0.35 m from G.L on 25.10.2021

No of SPT: 10 Nos

No of UDS : 1 No.

No of CR : 1 No..

Remarks

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 4**	**Drilling Hole Record-BH 4**	
Location	**: Karapakkam**	**Fig No. 04**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.28**
Ground Water Level	**: 0.35 m from G.L on 25.10.2021**	**Start Date**	**: 23.10.2021**
Termination Depth	**: 18.00 m**	**End Date**	**: 24.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Silty **CLAY** (CH)	Grey	Stiff, Layered				SPT-7	SS	12.00	12.00-12.45	5	7	6	13				
			13.50	84.78		SPT-8	SS	13.50	13.50-13.94	15	31	>50	>100				50/14 cm penetration
Weathered Rock						SPT-9	SS	15.00	15.00-15.13	>50	-	-	>100				50/13 cm penetration
						SPT-10	SS	16.50	16.50-16.50	>50	-	-	>100				Rebound
						CR-1	CS		16.50-18.00	-	-	-	-				
			18.00	80.28													

G.W.L: 0.35 m from G.L on 25.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 1 No..	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 5**
Location	**: Karapakkam**
Type of Boring	**: Calyx**
Ground Water Level	**: 0.50 m from G.L on 27.10.2021**
Termination Depth	**: 19.50 m**

Drilling Hole Record-BH 5

Fig No. 05

Reduced Level	**:**	**98.25**
Start Date	**:**	**25.10.2021**
End Date	**:**	**26.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Clayey **SAND** (SC)	Grey	Soft, Layered	3.00	95.25		SPT-1	SS	1.50	1.50-1.95	1	1	2	3				G.W.L
						SPT-2	SS	3.00	3.00-3.45	2	3	3	6				
Sandy **CLAY** (CH)	Grey	Medium Stiff, Layered	4.50	93.75		SPT-3	SS	4.50	4.50-4.95	6	10	14	24				
Silty **SAND** (SM)	Grey	Medium Dense, Granular	7.50	90.75		SPT-4	SS	6.00	6.00-6.45	8	9	12	21				
						SPT-5	SS	7.50	7.50-7.95	4	5	7	12				
Silty **CLAY** (CH)	Brown / Grey	Stiff, Layered				SPT-6	SS	9.00	9.00-9.45	4	6	7	13				
						SPT-7	SS	10.50	10.50-10.95	3	5	7	12				

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.50 from GL on 27.10.2021	No of SPT: 11 Nos	No of UDS : Nil.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 5**	**Drilling Hole Record-BH 5**	
Location	**: Karapakkam**	**Fig No. 05**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.25**
Ground Water Level	**: 0.50 m from G.L on 27.10.2021**	**Start Date**	**: 25.10.2021**
Termination Depth	**: 19.50 m**	**End Date**	**: 26.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Silty **CLAY** (CH)	Grey	Stiff, Layered				SPT-8	SS	12.00	12.00-12.45	4	6	7	13				
			13.50	84.75		SPT-9	SS	13.50	13.50-13.95	11	29	50	79				
Silty **SAND** (SM)	Brown	Very Dense, Granular	15.50	82.75		SPT-10	SS	15.00	15.00-15.42	12	41	>50	>100				50/12 cm penetration
						SPT-11	SS		16.50-16.62	>50	-	-	>100				50/12 cm penetration
Weathered Rock						CR-1	CS	16.50	16.62-17.50	-	-	-	-				
						CR-2	CS	17.50	17.50-18.50	-	-	-	-				Small Pieces
			18.50	79.75		CR-3	CS	18.50	18.50-19.50	-	-	-	-		60	30	
Jointed Rock			19.50	78.75													

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.50 from GL on 27.10.2021	No of SPT: 11 Nos	No of UDS : Nil.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

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Bore Hole No	**: BH 6**	**Drilling Hole Record-BH 6**	
Location	**: Karapakkam**	**Fig No. 06**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.25**
Ground Water Level	**: 0.4 m from G.L on 06.10.2021**	**Start Date**	**: 02.10.2021**
Termination Depth	**: 17.50 m**	**End Date**	**: 05.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	C.R (%)	R.Q.D(%)	REMARKS
Silty **CLAY** (CH)	Brown & Grey	Soft, Layered			SPT-1	SS	1.50	1.50-1.95	1	1	2	3			G.W.L
					UDS-1	OT	3.00	3.00-3.45	-	-	-	-			
			4.50	93.75	SPT-2	SS	4.50	4.50-4.95	1	2	3	5			
Gravelly Sandy **CLAY** (CH)	Brown & Grey	Medium Stiff, Layered	6.00	92.25	SPT-3	SS	6.00	6.00-6.45	12	14	17	31			
Clayey **SAND** (SC)	Brown & Grey	Dense,Granular	13.50	84.75	SPT-4	SS	7.50	7.50-7.95	8	10	12	22			
CLAY (CH)	Brown & Grey	Very Stiff, Layered			SPT-5	SS	9.00	9.00-9.45	6	8	9	17			
			10.50	87.75	SPT-6	SS	10.50	10.50-10.95	3	4	6	10			
		Stiff, Layered													

SPT 'N' PROFILE: 20 | 40 | 60 | 80 | 100

G.W.L: 0.4 from GL on 06.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 1 No.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 6**	**Drilling Hole Record-BH 6**	
Location	**: Karapakkam**	**Fig No. 06**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.25**
Ground Water Level	**: 0.4 m from G.L on 06.10.2021**	**Start Date**	**: 02.10.2021**
Termination Depth	**: 17.50 m**	**End Date**	**: 05.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
CLAY (CH)	Brown & Grey	Stiff, Layered				SPT-7	SS	12.00	12.00-12.45	2	5	7	12				
			13.50	84.75		SPT-8	SS	13.50	13.50-13.63	>50	-	-	>100				50/13 cm penetration
Weathered Rock						SPT-9	SS	15.00	15.00-15.07	>50	-	-	>100				50/07 cm penetration
									15.07-16.50	-	-	-	-				
			16.56	81.69		SPT-10	SS	16.50	16.50-16.56	>50	-	-	>100				50/06 cm penetration
Jointed Rock						CR-1	CS		16.56-17.50	-	-	-	-		50	43	
			17.50														

G.W.L: 0.4 from GL on 06.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 1 No.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

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Bore Hole No	**: BH 7**	**Drilling Hole Record-BH 7**	
Location	**: Karapakkam**	**Fig No. 07**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 97.32**
Ground Water Level	**: 0.3 m from G.L on 06.10.2021**	**Start Date**	**: 05.10.2021**
Termination Depth	**: 17.00 m**	**End Date**	**: 05.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE 20 40 60 80 100	C.R (%)	R.Q.D(%)	REMARKS
Sandy Silty **CLAY** (CI)	Brown	Medium Stiff, Layered				SPT-1	SS	1.50	1.50-1.95	1	2	4	6				G.W.L
			3.00	94.32		SPT-2	SS	3.00	3.00-3.45	4	3	5	8				
Greyish, Silty **CLAY** (CH)			4.50	92.82		SPT-3	SS	4.50	4.50-4.95	7	14	19	33				
Silty **SAND** (SM)	Brown	Dense, Granular				SPT-4	SS	6.00	6.00-6.45	9	16	22	38				
						SPT-5	SS	7.50	7.50-7.95	10	19	26	45				
			9.00	88.32		SPT-6	SS	9.00	9.00-9.45	4	9	11	20				
CLAY (CH)	Brown	Very Stiff, Layered				SPT-7	SS	10.50	10.50-10.95	6	13	15	28				

G.W.L: 0.3 from GL on 06.10.2021	No of SPT: 10 Nos	No of UDS : Nil.	No of CR : 1 No.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 7**	**Drilling Hole Record-BH 7**	
Location	**: Karapakkam**	**Fig No. 07**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 97.32**
Ground Water Level	**: 0.3 m from G.L on 06.10.2021**	**Start Date**	**: 05.10.2021**
Termination Depth	**: 17.00 m**	**End Date**	**: 05.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
CLAY (CH)	Brown	Very Stiff, Layered				SPT-8	SS	12.00	12.00-12.45	8	12	14	26				G.W.L
			13.50	83.82		SPT-9	SS	13.50	13.50-13.75	11	14	16	30				
Silty **SAND** (SM)	Brown	Medium Dense, Granular	15.00	82.32		SPT-10	SS		15.00-15.23	30	>50	-	>100				50/08 cm penetration
Weathered Rock						DS-1	CS	15.00	15.23-16.00	-	-	-	-				
			16.00	81.32		CR-1	CS	16.00									
Jointed Rock									16.00-17.00	-	-	-	-		33	23	
			17.00	80.32													

SPT 'N' PROFILE scale: 20, 40, 60, 80, >100

G.W.L: 0.3 from GL on 06.10.2021	No of SPT: 10 Nos	No of UDS : Nil.	No of CR : 1 No.	**Remarks**

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 8
Location	: Karapakkam
Type of Boring	: Calyx
Ground Water Level	: 0.5 m from G.L on 27.10.2021
Termination Depth	: 18.00 m

Drilling Hole Record-BH 8

Fig No. 08

Reduced Level	:	98.26
Start Date	:	25.10.2021
End Date	:	26.10.2021

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
														20 40 60 80 100			G.W.L
Silty **CALY** (CI)	Brown	Very Soft, Layered				SPT-1	SS	1.50	1.50-1.95	1	1	1	2				
			3.00	95.26		SPT-2	SS	3.00	3.00-3.45	2	3	4	7				
Sandy **CLAY** (CH)	Grey	Medium Stiff, Layered	4.50	93.76		UDS-1	OT	4.50	4.50-4.95	-	-	-	-				
CLAY (CH)	Grey	Stiff, Layered				SPT-3	SS	5.00	5.00-5.45	4	5	7	12				
			6.00	92.26		SPT-4	SS	6.00	6.00-6.45	5	5	7	12				
Silty **SAND** (SM)	Grey	Medium Dense, Granular	7.50	90.76		SPT-5	SS	7.50	7.50-7.95	6	7	8	15				
Clayey **SAND** (SC)	Grey	Medium Dense, Granular	9.00	89.26		SPT-6	SS	9.00	9.00-9.45	7	8	12	20				
Silty **CLAY** (CH)	Brown	Very Stiff, Layered				SPT-7	SS	10.50	10.50-10.95	7	10	15	25				

G.W.L: 0.5 m from G.L on 27.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 8**	**Drilling Hole Record-BH 8**	
Location	**: Karapakkam**	**Fig No. 08**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.26**
Ground Water Level	**: 0.5 m from G.L on 27.10.2021**	**Start Date**	**: 25.10.2021**
Termination Depth	**: 18.00 m**	**End Date**	**: 26.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Brownish, Very Stiff, Silty **CLAY** (CH)			12.00	86.26		SPT-8	SS	12.00	12.00-12.45	15	18	23	41				
Silty **CLAY** (CH)	Brown	Hard, Layered	13.50	84.76		SPT-9	SS	13.50	13.50-13.90	37	38	>50	>100				50/10 cm penetration
Weathered Rock						CR-1	CS	14.50	14.50-16.00	-	-	-	-		Nil	Nil	
						CR-2	CS	16.00	16.00-17.00	-	-	-	-		Nil	Nil	50/10 cm penetration
						CR-3	CS	17.00	17.00-18.00	-	-	-	-		Nil	Nil	
			18.00	80.26													

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.5 m from G.L on 27.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 9
Location	: Karapakkam
Type of Boring	: Calyx
Ground Water Level	: 0.5 m from G.L on 25.10.2021
Termination Depth	: 18.00 m

Drilling Hole Record-BH 9

Fig No. 09

Reduced Level	:	98.27
Start Date	:	23.10.2021
End Date	:	24.10.2021

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE 20 40 60 80 100	C.R (%)	R.Q.D(%)	REMARKS
Silty **CALY** (CH)	Brown	Soft, Layered				SPT-1	SS	1.50	1.50-1.95	1	2	2	4				G.W.L
			3.00	95.27		SPT-2	SS	3.00	3.00-3.45	3	4	6	10				
	Grey	Stiff, Layered	4.50	93.77		SPT-3	SS	4.50	4.50-4.95	4	5	7	12				
Clayey **SAND** (SC)	Grey	Medium Dense, Granular				SPT-4	SS	6.00	6.00-6.45	7	9	13	22				
	Grey & Brown					SPT-5	SS	7.50	7.50-7.95	8	10	15	25				
			9.00	89.27		UDS-1	OT	9.00	9.00-9.45	-	-	-	-				
CLAY (CH)	Grey & Brown	Very Stiff, Layered				SPT-6	SS	10.50	10.50-10.95	9	13	15	28				

G.W.L: 0.5 m from G.L on 25.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 9**	**Drilling Hole Record-BH 9**	
Location	**: Karapakkam**	**Fig No. 09**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.27**
Ground Water Level	**: 0.5 m from G.L on 25.10.2021**	**Start Date**	**: 23.10.2021**
Termination Depth	**: 18.00 m**	**End Date**	**: 24.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Greyish & Brownish, Very Stiff, **CLAY** (CH)			12.00	86.27		SPT-7	SS	12.00	12.00-12.45	5	7	24	31				
CLAY (CH)	Grey & Brown	Hard, Layered	13.50	84.77		SPT-8	SS	13.50	13.50-13.95	15	28	40	68				
Silty **SAND** (SM)	Brown	Very Dense, Granular	15.00	83.27		SPT-9	SS	15.00	15.00-15.22	25	>50	-	>100				50/7 cm penetration
Weathered Rock			16.50	81.77		CR-1	CS	15.50	15.50-16.50	-	-	-	-		Nil	Nil	
						CR-2	CS	16.50	16.50-17.50	-	-	-	-		12	Nil	
Jointed Rock			18.00	80.27		CR-3	CS	17.50	17.50-18.00	-	-	-	-		20	Nil	

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.5 m from G.L on 25.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 10**	**Drilling Hole Record-BH 10**	
Location	**: Karapakkam**	**Fig No. 10**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.31**
Ground Water Level	**: 0.4 m from G.L on 02.11.2021**	**Start Date**	**: 31.10.2021**
Termination Depth	**: 19.50 m**	**End Date**	**: 01.11.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
														20 40 60 80 100			G.W.L
CLAY (CH)	Brown	Medium Stiff, Layered				SPT-1	SS	1.50	1.50-1.95	2	3	3	6				
						UDS-1	OT	3.00	3.00-3.45	-	-	-	-				
CLAY (CI)	Grey		4.50	93.81		SPT-2	SS	4.50	4.50-4.95	5	8	12	20				
Clayey **SAND** (SC)	Grey	Medium Dense, Granular	7.50	90.81		SPT-3	SS	6.00	6.00-6.45	6	12	15	28				
						SPT-4	SS	7.50	7.50-7.95	5	6	10	16				
CLAY (CH)	Brown	Very Stiff, Layered	10.50	87.81		SPT-5	SS	9.00	9.00-9.45	6	8	10	18				
	Grey	Stiff, Layered				SPT-6	SS	10.50	10.50-10.95	3	5	6	11				

G.W.L: 0.4 m from G.L on 02.11.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 10**
Location	**: Karapakkam**
Type of Boring	**: Calyx**
Ground Water Level	**: 0.4 m from G.L on 02.11.2021**
Termination Depth	**: 19.50 m**

Drilling Hole Record-BH 10

Fig No. 10

Reduced Level	**:**	**98.31**
Start Date	**:**	**31.10.2021**
End Date	**:**	**01.11.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	C.R (%)	R.Q.D(%)	REMARKS
Greyish, Stiff, **CLAY** (CH)			12.00	86.31		SPT-7	SS	12.00	12.00-12.45	4	6	10	16			
CLAY (CH)	Grey	Very Stiff, Layered	13.50	84.81		SPT-8	SS	13.50	13.50-13.92	7	18	>50	>100			50/12 cm penetration
Weathered Rock						SPT-9	SS	15.00	15.00-15.21	29	>50	-	>100			50/6 cm penetration
						CR-1	CS	15.50	15.50-17.00	-	-	-	-	Nil	Nil	
						CR-2	CS	17.00	17.00-18.50	-	-	-	-	Nil	Nil	
			18.50	79.81		CR-3	CS	18.50	18.50-19.50	-	-	-	-	35	14	
Jointed Rock			19.50	78.81												

SPT 'N' PROFILE: 20, 40, 60, 80, 100

G.W.L: 0.4 m from G.L on 02.11.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 11
Location	: Karapakkam
Type of Boring	: Calyx
Ground Water Level	: 0.5 m from G.L on 15.10.2021
Termination Depth	: 19.0 m

Drilling Hole Record-BH 11

Fig No. 11

Reduced Level	:	98.26
Start Date	:	13.10.2021
End Date	:	14.10.2021

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Sandy Silty **CLAY** (CH)	Brown	Medium Stiff, Layered	3.00	95.26		SPT-1	SS	1.50	1.50-1.95	2	3	5	8				G.W.L
						SPT-2	SS	3.00	3.00-3.45	3	4	6	10				
Silty **CLAY** (CI)	Grey	Stiff, Layered	4.50	93.76		SPT-3	SS	4.50	4.50-4.95	5	8	10	18				
Silty **SAND** (SM)	Grey	Medium Dense, Granular	6.00	92.26		SPT-4	SS	6.00	6.00-6.45	7	13	17	30				
Silty Clayey **SAND** (SC)	Grey	Medium Dense, Granular	7.50	90.76		SPT-5	SS	7.50	7.50-7.95	8	15	19	34				
Silty **SAND** (SM)	Grey	Medium Dense, Granular	9.00	89.26		SPT-6	SS	9.00	9.00-9.45	2	3	6	9				
CLAY (CH)	Grey / Brown	Stiff, Layered				SPT-7	SS	10.50	10.50-10.95	4	5	7	12				

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.5 m from G.L on 15.10.2021	No of SPT: 11 Nos	No of UDS : Nil	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 11**	**Drilling Hole Record-BH 11**	
Location	**: Karapakkam**	**Fig No. 11**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.26**
Ground Water Level	**: 0.5 m from G.L on 15.10.2021**	**Start Date**	**: 13.10.2021**
Termination Depth	**: 19.0 m**	**End Date**	**: 14.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
CLAY (CH)	Brown	Stiff, Layered				SPT-8	SS	12.00	12.00-12.45	6	7	10	17				
			13.50	84.76		SPT-9	SS	13.50	13.50-13.95	11	17	42	59				
Silty **SAND** (SM)	Brown	Very Dense	15.00	83.26		SPT-10	SS	15.00	15.00-15.25	25	>50	-	>100				50/10 cm Penetration
Weathered Rock						SPT-11	SS	16.50	16.50-16.75	30	>50	-	>100				50/10 cm Penetration
						CR-1	CS		16.75-18.00	-	-	-	-		Nil	Nil	
						CR-2	CS	18.00	18.00-19.00	-	-	-	-		Nil	Nil	
			19.00	79.26													

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.5 m from G.L on 15.10.2021	No of SPT: 11 Nos	No of UDS : Nil	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 12**	**Drilling Hole Record-BH 12**	
Location	**: Karapakkam**	**Fig No. 12**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.27**
Ground Water Level	**: 0.45 m from G.L on 14.10.2021**	**Start Date**	**: 12.10.2021**
Termination Depth	**: 20.00 m**	**End Date**	**: 13.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	C.R (%)	R.Q.D(%)	REMARKS
Silty **CLAY** (CH)	Brown	Medium Stiff, Layered			SPT-1	SS	1.50	1.50-1.95	2	2	4	6			G.W.L
			3.00	95.27	UDS-1	OT	3.00	3.00-3.45	-	-	-	-			
CLAY (CH)	Grey	Medium Stiff, Layered	4.50	93.77	SPT-2	SS	4.50	4.50-4.95	2	5	7	12			
Silty **SAND** (SM)	Grey	Medium Dense, Granular			SPT-3	SS	6.00	6.00-6.45	4	6	8	14			
	Brownish & Grey				SPT-4	SS	7.50	7.50-7.95	7	10	12	22			
	Grey		9.00	89.27	SPT-5	SS	9.00	9.00-9.45	3	5	7	12			
Clayey **SAND** (SC)	Brownish & Grey	Medium Dense, Granular	10.50	87.77	SPT-6	SS	10.50	10.50-10.95	4	5	9	14			
Brownish & Grey, Stiff, **CLAY** (CH)															

SPT 'N' PROFILE: 20 | 40 | 60 | 80 | 100

G.W.L: 0.45 m from G.L on 14.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.
No of CR : 2 Nos.	**Remarks**	

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 12**	**Drilling Hole Record-BH 12**	
Location	**: Karapakkam**	**Fig No. 12**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.27**
Ground Water Level	**: 0.45 m from G.L on 14.10.2021**	**Start Date**	**: 12.10.2021**
Termination Depth	**: 20.00 m**	**End Date**	**: 13.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Brownish Grey, Stiff, **CLAY** (CH)			12.00	86.27		SPT-7	SS	12.00	12.00-12.45	6	8	13	21				
CLAY (CH)	Brownish & Grey	Very Stiff, Layered	13.50	84.77		SPT-8	SS	13.50	13.50-13.95	9	16	21	37				50/10 cm penetration
Silty **SAND** (SM)	Brown	Dense, Granular	15.00	83.27		SPT-9	SS	15.00	15.00-15.45	17	23	36	59				50/07 cm penetration
Silty Gravelly **SAND** (SP)	Brown	Very Dense, Granular	16.50	81.77		SPT-10	SS	16.50	16.50-16.73	30	>50	-	>100				50/8cm Penetration
Weathered Rock			19.00	79.27		CR-1	CS	17.50	17.50-19.00	-	-	-	-		Nil	Nil	
Jointed Rock			20.00	78.27		CR-2	CS	19.00	19.00-20.00	-	-	-	-		26	Nil	

G.W.L: 0.45 m from G.L on 14.10.2021 | No of SPT: 10 Nos | No of UDS : 1 No. | No of CR : 2 Nos. | **Remarks**

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 13**
Location	**: Karapakkam**
Type of Boring	**: Calyx**
Ground Water Level	**: 0.35 m from G.L on 09.10.2021**
Termination Depth	**: 19.50 m**

Drilling Hole Record-BH 13

Fig No. 13

Reduced Level	**:**	**98.26**
Start Date	**:**	**07.10.2021**
End Date	**:**	**08.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE 20 40 60 80 100	C.R (%)	R.Q.D(%)	REMARKS
Silty **CLAY** (CH)	Brown	Medium Stiff, Layered				SPT-1	SS	1.50	1.50-1.95	1	2	4	6				G.W.L
	Grey					UDS-1	OT	3.00	3.00-3.45	-	-	-	-				
Silty **CLAY** (CI)			6.00	92.26		SPT-2	SS	4.50	4.50-4.95	2	3	5	8				
Clayey **SAND** (SC)	Grey	Medium Dense, Granular	7.50	90.76		SPT-3	SS	6.00	6.00-6.45	6	9	13	22				
Clayey Silty **SAND** (SM)	Brown	Medium Dense, Granular	9.00	89.26		SPT-4	SS	7.50	7.50-7.95	7	11	15	26				
CLAY (CH)	Brown & Grey	Medium Stiff, Layered	10.50	87.76		SPT-5	SS	9.00	9.00-9.45	2	2	4	6				
		Stiff, Layered				SPT-6	SS	10.50	10.50-10.95	3	5	6	11				

G.W.L: 0.35 m from G.L on 09.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 13**	**Drilling Hole Record-BH 13**	
Location	**: Karapakkam**	**Fig No. 13**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.26**
Ground Water Level	**: 0.35 m from G.L on 09.10.2021**	**Start Date**	**: 07.10.2021**
Termination Depth	**: 19.50 m**	**End Date**	**: 08.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Brownish & Greyish Stiff, **CLAY**(CH)			12.00	86.26		SPT-7	SS	12.00	12.00-12.45	5	7	9	16				G.W.L
CLAY (CH)	Grey	Very Stiff, Layered	13.50	84.76		SPT-8	SS	13.50	13.50-13.95	7	11	17	28				
Silty **SAND** (SM)	Brown	Medium Dense, Granular	15.00	83.26		SPT-9	SS	15.00	15.00-15.27	23	>50	-	>100				50/12 cm Penetration
Weathered Rock						SPT-10	SS	16.50	16.50-16.55	>50	-	-	>100				50/5cm Penetration
						CR-1	CS		16.55-18.00	-	-	-	-		Nil	Nil	
						CR-2	CS	18.00	18.00-19.00	-	-	-	-		Nil	Nil	
			19.00	79.26		CR-3	CS	19.00	19.00-19.50	-	-	-	-		24	24	
Jointed Rock			19.50	78.76													

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.35 m from G.L on 09.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 14**
Location	**: Karapakkam**
Type of Boring	**: Calyx**
Ground Water Level	**: 0.40 m from G.L on 11.10.2021**
Termination Depth	**: 19.50 m**

Drilling Hole Record-BH 14

Fig No. 14

Reduced Level	**:**	**98.28**
Start Date	**:**	**09.10.2021**
End Date	**:**	**10.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE 20 40 60 80 100	C.R (%)	R.Q.D(%)	REMARKS
CLAY (CH)	Brown	Medium Stiff, Layered				SPT-1	SS	1.50	1.50-1.95	1	2	4	6				G.W.L
						UDS-1	OT	3.00	3.00-3.45	-	-	-	-				
CLAY (CI)	Grey		4.50	93.78		SPT-2	SS	4.50	4.50-4.95	4	7	11	18				
Clayey **SAND** (SC)	Grey	Medium Dense, Granular				SPT-3	SS	6.00	6.00-6.45	6	14	16	30				
			7.50	90.78		SPT-4	SS	7.50	7.50-7.95	8	17	21	38				
Silty **SAND** (SM)	Grey	Dense, Granular	9.00	89.28		SPT-5	SS	9.00	9.00-9.45	3	5	8	13				
CLAY (CH)	Grey	Stiff, Layered				SPT-6	SS	10.50	10.50-10.95	4	6	11	17				

G.W.L: 0.40 m from G.L on 11.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 14**	**Drilling Hole Record-BH 14**	
Location	**: Karapakkam**	**Fig No. 14**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.28**
Ground Water Level	**: 0.40 m from G.L on 11.10.2021**	**Start Date**	**: 09.10.2021**
Termination Depth	**: 19.50 m**	**End Date**	**: 10.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	C.R (%)	R.Q.D(%)	REMARKS
Greyish, Stiff, **CLAY** (CH)			12.00	86.28		SPT-7	SS	12.00	12.00-12.45	5	7	13	20			G.W.L
CLAY (CH)	Grey	Very Stiff, Layered	13.50	84.78		SPT-8	SS	13.50	13.50-13.95	8	20	27	47			
Silty Clayey **SAND** (SC)	Brown	Dense, Granular	15.00	83.28		SPT-9	SS	15.00	15.00-15.25	20	>50	-	>100			50/10 cm penetration
Weathered Rock			17.50	80.78		CR-1	CS	16.00	16.00-17.50	-	-	-	-	Nil	Nil	
Jointed Rock			18.50	79.78		CR-2	CS	17.50	17.50-18.50	-	-	-	-	40	15	

SPT 'N' PROFILE: 20, 40, 60, 80, 100

G.W.L: 0.40 m from G.L on 11.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 15**
Location	**: Karapakkam**
Type of Boring	**: Calyx**
Ground Water Level	**: 0.45 m from G.L on 13.10.2021**
Termination Depth	**: 19.00 m**

Drilling Hole Record-BH 15

Fig No. 15

Reduced Level	**:**	**98.28**
Start Date	**:**	**11.10.2021**
End Date	**:**	**12.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	C.R (%)	R.Q.D(%)	REMARKS
CLAY (CH)	Brown	Soft, Layered	3.00	95.28	SPT-1	SS	1.50	1.50-1.95	1	1	1	2			G.W.L
	Grey	Stiff, Layered	6.00	92.28	SPT-2	SS	3.00	3.00-3.45	3	5	7	12			
					UDS-1	OT	4.50	4.50-4.95	-	-	-	-			
					SPT-3	SS	6.00	6.00-6.45	6	10	13	23			
Silty **SAND** (SM)	Brown	Medium Dense, Granular	7.50	90.78	SPT-4	SS	7.50	7.50-7.95	8	11	16	27			
CLAY (CH)	Grey	Very Stiff, Layered	9.00	89.28	SPT-5	SS	9.00	9.00-9.45	4	6	6	12			
		Stiff, Layered	10.50	87.78	SPT-6	SS	10.50	10.50-10.95	9	13	17	30			
		Very Stiff, Layered													

SPT 'N' PROFILE: 20 | 40 | 60 | 80 | 100

G.W.L: 0.45 m from G.L on 13.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 15**	**Drilling Hole Record-BH 15**	
Location	**: Karapakkam**	**Fig No. 15**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.28**
Ground Water Level	**: 0.45 m from G.L on 13.10.2021**	**Start Date**	**: 11.10.2021**
Termination Depth	**: 19.00 m**	**End Date**	**: 12.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Greyish, Very Stiff, **CLAY** (CH)			12.00	86.28													G.W.L
Silty **SAND** (SM)	Brown	Dense, Granular				SPT-7	SS	12.00	12.00-12.45	7	13	19	32				
			13.50	84.78		SPT-8	SS	13.50	13.50-13.73	30	>50	-	>100				50/8 cm penetration
Weathered Rock						SPT-9	SS		15.00-15.08	>50	-	-	>100				50/8 cm penetration
						CR-1	CS	15.00	15.08-16.50	-	-	-	-		Nil	Nil	
						CR-2	CS	16.50	16.50-18.00	-	-	-	-		Nil	Nil	
			18.00	80.28		CR-3	CS	18.00	18.00-19.00	-	-	-	-		23	Nil	
Jointed Rock			19.00	79.28													

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.45 m from G.L on 13.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 3 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 16**	**Drilling Hole Record-BH 16**	
Location	**: Karapakkam**	**Fig No. 16**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.29**
Ground Water Level	**: 0.40 m from G.L on 10.10.2021**	**Start Date**	**: 09.10.2021**
Termination Depth	**: 18.50 m**	**End Date**	**: 09.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	C.R (%)	R.Q.D(%)	REMARKS
CLAY (CH)	Brown	Soft, Layered			SPT-1	SS	1.50	1.50-1.95	1	1	1	2			G.W.L
					UDS-1	OT	3.00	3.00-3.45	-	-	-	-			
			4.50	93.79	SPT-2	SS	4.50	4.50-4.95	1	2	4	6			
		Medium Stiff, Layered	6.00	92.29	SPT-3	SS	6.00	6.00-6.45	6	9	13	22			
	Grey	Very Stiff, Layered	7.50	90.79	SPT-4	SS	7.50	7.50-7.95	11	14	16	30			
Sandy **CLAY** (CH)	Brown	Medium Dense, Granular	9.00	89.29	SPT-5	SS	9.00	9.00-9.45	10	15	21	36			
Clayey **SAND** (SC)	Brown	Dense, Granular	10.50	87.79	SPT-6	SS	10.50	10.50-10.95	5	8	10	18			
CLAY (CH)	Grey	Very Stiff, Layered													

SPT 'N' PROFILE: 20 | 40 | 60 | 80 | 100

G.W.L: 0.40 m from G.L on 10.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 16**	**Drilling Hole Record-BH 16**	
Location	**: Karapakkam**	**Fig No. 16**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.29**
Ground Water Level	**: 0.40 m from G.L on 10.10.2021**	**Start Date**	**: 09.10.2021**
Termination Depth	**: 18.50 m**	**End Date**	**: 09.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	C.R (%)	R.Q.D(%)	REMARKS
CLAY (CH)	Grey	Very Stiff, Layered				SPT-7	SS	12.00	12.00-12.45	7	9	11	20			G.W.L
						SPT-8	SS	13.50	13.50-13.95	7	11	15	26			
			15.00	83.29		SPT-9	SS	15.00	15.00-15.27	19	28	43	71			
Sandy **CLAY** (CH)	Brown	Hard, Layered	16.50	81.79		SPT-10	SS	16.50	16.50-16.75	29	>50	-	>100			50/10cm Penetration
Weathered Rock			17.50	80.79		CR-1	CS		16.75-17.50	-	-	-	-	Nil	Nil	
Jointed Rock			18.50	79.79		CR-2	CS	17.50	17.50-18.50	-	-	-	-	30	20	

SPT 'N' PROFILE: 20, 40, 60, 80, 100

G.W.L: 0.40 m from G.L on 10.10.2021	No of SPT: 10 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 17**
Location	**: Karapakkam**
Type of Boring	**: Calyx**
Ground Water Level	**: 0.40 m from G.L on 13.10.2021**
Termination Depth	**: 18.50 m**

Drilling Hole Record-BH 17

Fig No. 17

Reduced Level	**:**	**98.29**
Start Date	**:**	**11.10.2021**
End Date	**:**	**12.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
														20 40 60 80 100			G.W.L
CLAY (CH)	Brown	Medium Stiff, Layered				SPT-1	SS	1.50	1.50-1.95	2	2	3	5				
						SPT-2	SS	3.00	3.00-3.45	1	3	4	7				
	Grey					UDS-1	OT	4.50	4.50-4.95	-	-	-	-				
			6.00	92.29		SPT-3	SS	6.00	6.00-6.45	7	11	14	25				
Clayey **SAND** (SC)	Grey	Medium Dense, Granular	7.50	90.79		SPT-4	SS	7.50	7.50-7.95	9	13	18	31				
Sandy **CLAY** (CL)	Grey	Hard, Layered	9.00	89.29		SPT-5	SS	9.00	9.00-9.45	2	4	5	9				
CLAY (CH)	Grey	Stiff, Layered				SPT-6	SS	10.50	10.50-10.95	3	6	8	14				

G.W.L: 0.40 m from G.L on 13.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**
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Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	**: BH 17**	**Drilling Hole Record-BH 17**	
Location	**: Karapakkam**	**Fig No. 17**	
Type of Boring	**: Calyx**	**Reduced Level**	**: 98.29**
Ground Water Level	**: 0.40 m from G.L on 13.10.2021**	**Start Date**	**: 11.10.2021**
Termination Depth	**: 18.50 m**	**End Date**	**: 12.10.2021**

SOIL DESCRIPTION	COLOUR	STRUCTURE	DEPTH BELOW GROUND LEVEL (m)	REDUCED LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH BELOW GROUND LEVEL (m)	TEST DEPTH	PENETRATION VALUES 15cm	30cm	45cm	SPT"N" Blows/300mm	SPT 'N' PROFILE	C.R (%)	R.Q.D(%)	REMARKS
Greyish, Stiff, **CLAY** (CH)			12.00	86.29		SPT-7	SS	12.00	12.00-12.45	5	7	11	18				
CLAY (CH)	Brown &Grey	Very Stiff, Layered	13.50	84.79		SPT-8	SS	13.50	13.50-13.95	9	24	37	61				
Silty **SAND** (SM)	Brown	Very Dense, Granular	15.00	83.29		SPT-9	SS	15.00	15.00-15.42	12	31	>50	>100				50/12 cm penetration
Weathered Rock			16.50	81.79		CR-1	CS	15.50	15.50-16.50	-	-	-	-		Nil	Nil	
Jointed Rock			17.50	80.79		CR-2	CS	16.50	16.50-17.50	-	-	-	-		30	25	

SPT 'N' PROFILE scale: 20, 40, 60, 80, 100

G.W.L: 0.40 m from G.L on 13.10.2021	No of SPT: 9 Nos	No of UDS : 1 No.	No of CR : 2 Nos.	**Remarks**

Note: SPT-Standard Peneration Test
SS-Split Spoon Sample
OT- Open Tube

UDS-Un Disturbed Sample
CS-Core Sample

CR-Core Recovery
RQD-Rock Quality Designation

APPENDIX – II

LABORATORY TEST RESULTS

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 17.10.2021 | **Table No. 1**

Boring End : 18.10.2021 | **Bore-Hole No. 1**

Location | **G.W.T: 0.3 m**

Karapakkam | **Termination Depth:17.5 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
3	3	1.50	SPT-1	Sandy **CLAY**	CH	0	23	77	57	19	38				36	2.44				
-	-	3.00	UDS-1		CH				61	22	39		1.27	1.71	35	2.40	45			
5	5	4.50	SPT-2		CH	0	44	56	52	17	35							UCS	0.29	
7	7	6.00	SPT-3	**CLAY**	CH				62	22	40				26					
10	10	7.50	SPT-4		CH	0	4	96	67	20	47				34					
12	12	9.00	SPT-5	Sandy **CLAY**	CH	0	13	87	54	21	33				22			UCS	0.67	
13	13	10.50	SPT-6	**CLAY**	CH				68	25	43									
35	35	12.00	SPT-7		CH				67	29	38				25	2.34	74			
>100	>100	13.50-13.75	SPT-8	**Weathered Rock**	SP	1	91	8										DS		39
>100	>100	15.00-15.07	SPT-9																	
-	-	15.07-16.50	CR-1																	
-	-	16.50-17.50	CR-2	**JOINTED ROCK**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 19.10.2021 | **Table No. 2**

Boring End : 20.10.2021 | **Bore-Hole No. 2**

Location | **G.W.T: 0.3 m**

Karapakkam | **Termination Depth:18.5 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
3	3	1.50	SPT-1	Silty **CLAY**	CH				52	22	30				36	2.52				
-	-	3.00	UDS-1																	
6	6	4.50	SPT-2		CH				62	32	30				38	2.54	52	UCS	0.6	
12	15	6.00	SPT-3	Silty **SAND**	SM	0	81	19												
16	17	7.50	SPT-4		SM	0	80	20												
12	12	9.00	SPT-5	Sandy **CLAY**		0	29	71												
14	14	10.50	SPT-6	**CLAY**	CH				50	26	24					2.50	50	TA	1.46	
20	18	12.00	SPT-7	Silty **SAND**	SM	0	67	33							17					
>100	>100	13.50-13.75	SPT-8	**Weathered Rock**	SM	0	67	33												
>100	>100	15.00-15.22	SPT-9																	
-	-	15.22-16.50	CR-1																	
-	-	16.50-17.50	CR-2																	
-	-	17.50-18.50	CR-3	**JOINTED ROCK**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 21.10.2021 | **Table No. 3**

Boring End : 22.10.2021 | **Bore-Hole No. 3**

Location | **G.W.T: 0.4 m**

Karapakkam | **Termination Depth:18.0 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
4	4	1.50	SPT-1	Sandy Silty **CLAY**	CI	0	36	64	42	17	25				25	2.49	45			
-	-	3.00	UDS-1	Silty **CLAY**	CI				44	20	24		1.40	1.69	21			UCS	0.27	
20	21	4.50	SPT-2	Silty **SAND**	SM	0	74	26							14	2.48				
43	34	6.00	SPT-3		SM	0	82	18								2.56				
21	21	7.50	SPT-4	Sandy Silty **CLAY**	CI	0	22	78	42	17	25				27	2.48				
12	12	9.00	SPT-5	Silty **CLAY**	CH				68	20	48				30		76			
15	15	10.50	SPT-6		CH				53	20	33				31					
24	24	12.00	SPT-7		CL				29	16	13				14					
>100	>100	13.50-13.90	SPT-8	**Weathered Rock**	SC	17	51	32	30	16	14					2.57				
>100	>100	15.00-15.10	SPT-9																	
-	-	15.10-17.00	CR-1	**JOINTED ROCK**																
-	-	17.00-18.00	CR-2																	

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 23.10.2021 | **Table No. 4**

Boring End : 24.10.2021 | **Bore-Hole No. 4**

Location | **G.W.T: 0.35 m**

Karapakkam | **Termination Depth:18 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
3	3	1.50	SPT-1	Sandy Silty **CLAY**	CH	0	31	69	60	19	41				25					
-	-	3.00	UDS-1	**CLAY**	CI				42	21	21		1.40	1.71	22			TA	0.21	
10	20	4.50	SPT-2	Silty **SAND**	SM	0	73	27							20	2.49				
27	24	6.00	SPT-3		SM	0	76	24										DS		32
14	14	7.50	SPT-4	Sandy **SILT**	ML	0	30	70	35	Non-Plastic					31					
16	16	9.00	SPT-5	Silty **CLAY**	CH				51	20	31									
9	9	10.50	SPT-6		CH				88	32	56				33	2.71				
13	13	12.00	SPT-7		CH				84	30	54				40			UCS	0.70	
>100	>100	13.50-13.94	SPT-8	**Weathered Rock**	SM	3	74	23								2.71				
>100	>100	15.00-15.13	SPT-9															DS		40
>100	>100	16.50-16.50	SPT-10																	
-	-	16.50-18.00	CR-1																	

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 25.10.2021 | **Table No. 5**

Boring End : 26.10.2021 | **Bore-Hole No. 5**

Location | **G.W.T: 0.5 m**

Karapakkam | **Termination Depth:19.5 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
3	5	1.50	SPT-1	Clayey **SAND**	SC	0	57	43	35	15	20				22	2.51				
6	6	3.00	SPT-2	Sandy **CLAY**	CH				64	31	33	55				2.46		UCS	0.32	
24	23	4.50	SPT-3	Silty **SAND**	SM	0	77	23					1.52	1.72	13	2.67				
21	21	6.00	SPT-4		SM	0	79	21										DS		33
12	12	7.50	SPT-5	Silty **CLAY**	CH				56	25	31						25			
13	13	9.00	SPT-6		CH				51	23	28				32		91			
12	12	10.50	SPT-7		CH				80	32	48							UCS	0.62	
13	13	12.00	SPT-8		CH				75	30	45	66			37	2.71	135			
79	47	13.50	SPT-9	Silty **SAND**	SM	3	59	38	Non - Plastic									DS	0.26	30
>100	>100	15.00-15.42	SPT-10	**Weathered Rock**	SM	7	57	36	Non - Plastic						13					
>100	>100	16.50-16.62	SPT-11		SM	20	63	17										DS		39
-	-	16.62-17.50	CR-1																	
-	-	17.50-18.50	CR-2																	
-	-	18.50-19.50	CR-3	**JOINTED ROCK**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 27.10.2021 | **Table No. 6**

Boring End : 28.10.2021 | **Bore-Hole No. 6**

Location | **G.W.T: 0.4 m**

Karapakkam | **Termination Depth:17.5 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
3	3	1.50	SPT-1	Silty **CLAY**	CH				61	24	37				30	2.36	50			
-	-	3.00	UDS-1		CH				53	22	31		1.34	1.72	28			TA	0.27	
5	5	4.50	SPT-2	Gravelly Sandy **CLAY**	CH	10	23	76	70	22	48				29	2.45				
31	27	6.00	SPT-3	Clayey **SAND**	SC	1	77	22	35	13	22					2.48				
22	22	7.50	SPT-4	**CLAY**	CH				63	22	41					2.46				
17	17	9.00	SPT-5		CH				62	21	41				25			UCS	0.57	
10	10	10.50	SPT-6		CH	0	1	99	87	25	62					2.23				
12	12	12.00	SPT-7		CH				55	32	23						127			
>100	>100	13.50-13.63	SPT-8	**Weathered Rock**	SM	22	45	33	Non - Plastic									DS		37
>100	>100	15.00-15.02	SPT-9																	
>100	>100	16.50-16.56	SPT-10																	
-	-	16.56-17.50	CR-1	**JOINTED ROCK**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 29.10.2021 | **Table No. 7**

Boring End : 30.10.2021 | **Bore-Hole No. 7**

Location | **G.W.T: 0.3 m**

Karapakkam | **Termination Depth:17.0 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
6	6	1.50	SPT-1	Sandy Silty **CLAY**	CI	0	32	68	45	17	28				23					
8	8	3.00	SPT-2	Silty **CLAY**	CH				80	25	65		1.27	1.76	39			UCS	0.47	
33	30	4.50	SPT-3	Silty **SAND**	SM	0	74	26								2.47				
38	31	6.00	SPT-4		SM	6	71	23							14					
45	34	7.50	SPT-5		SM	0	85	15							15			DS	0.31	20
20	20	9.00	SPT-6	**CLAY**	CH				56	21	35					2.41	35			
28	28	10.50	SPT-7		CH				65	23	42				40			UCS	1.38	
26	26	12.00	SPT-8		CH				57	19	38						30			
30	23	13.50	SPT-9	Silty **SAND**	SM	2	77	21							15	2.51				
>100	>100	15.00-15.23	SPT-10	**Weathered Rock**		8	75	17										DS		41
-	-	15.23-16.00	CR-1																	
-	-	16.00-17.00	CR-2	**JOINTED ROCK**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 21.10.2021 | **Table No. 8**

Boring End : 22.10.2021 | **Bore-Hole No. 8**

Location | **G.W.T: 0.5 m**

Karapakkam | **Termination Depth:18.0 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
2	2	1.50	SPT-1	Silty **CLAY**	CI				46	27	19	35			33	2.38	50			
7	7	3.00	SPT-2	Sandy **CLAY**	CH	1	42	57	56	18	38		1.32	1.70	29					
-	-	4.50	UDS-1	**CLAY**																
12	12	5.00	SPT-3		CH				58	23	35					2.41		TA	0.7	
12	15	6.00	SPT-4	Silty **SAND**	SM	0	80	20							17			DS		32
15	16	7.50	SPT-5	Clayey **SAND**	SC	1	67	32	29	15	14				15	2.56				
20	20	9.00	SPT-6	Silty **CLAY**	CH				85	28	57				35	2.72				
25	25	10.50	SPT-7		CH				62	23	39									
41	41	12.00	SPT-8		CH				56	21	35				30			UCS	1.81	
>100	>100	13.50-13.90	SPT-9	**Weathered Rock**	SM	18	62	20								2.70				
-	-	14.50-16.00	CR-1																	
-	-	16.00-17.00	CR-2																	
-	-	17.00-18.00	CR-3																	

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 23.10.2021 | **Table No. 9**

Boring End : 24.10.2021 | **Bore-Hole No. 9**

Location | **G.W.T: 0.5 m**

Karapakkam | **Termination Depth:18.0 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
4	4	1.50	SPT-1	Silty **CLAY**	CH				56	27	29				39					
10	10	3.00	SPT-2		CH				67	23	44				40	2.44		UCS	0.6	
12	12	4.50	SPT-3	Clayey **SAND**	SC	0	55	45	53	17	36									
22	21	6.00	SPT-4		SC	0	79	21	25	14	11				15					
25	22	7.50	SPT-5		SC	0	76	24	32	14	18					2.55				
-	-	9.00	UDS-1	**CLAY**														TA	1.47	
28	28	10.50	SPT-6		CH				67	31	36				34		73			
31	31	12.00	SPT-7		CH				63	22	41					2.45	105			
68	41	13.50	SPT-8	Silty **SAND**	SM	1	72	27								2.52				
>100	>100	15.00-15.22	SPT-9	**Weathered Rock**	SM	3	86	11							14			DS		39
-	-	15.50-16.50	CR-1																	
-	-	16.50-17.50	CR-2	**JOINTED ROCK**																
-	-	17.50-18.00	CR-3																	

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 31.10.2021 | **Table No. 10**

Boring End : 01.11.2021 | **Bore-Hole No. 10**

Location | **G.W.T: 0.4 m**

Karapakkam | **Termination Depth:19.5 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
6	6	1.50	SPT-1	**CLAY**	CH				56	21	35				38	2.44				
-	-	3.00	UDS-1		CI				47	20	27		1.55	1.87	21			TA	0.71	
20	21	4.50	SPT-2	Clayey **SAND**	SC	0	74	26	28	21	7				16	2.57				
28	25	6.00	SPT-3		SC				27	14	13				15					
16	16	7.50	SPT-4	**CLAY**	CH				57	21	36					2.48	45	UCS	0.92	
18	18	9.00	SPT-5		CH				60	21	39					2.43				
11	11	10.50	SPT-6		CH				79	34	45							UCS	0.61	
16	16	12.00	SPT-7		CH				85	33	52				42		123			
>100	>100	13.50-13.92	SPT-8	**Weathered Rock**	SM	6	76	18							16	2.62				
>100	>100	15.00-15.21	SPT-9		SM	3	58	39	Non - Plastic											
-	-	15.50-17.00	CR-1																	
-	-	17.00-18.50	CR-2																	
-	-	18.50-19.50	CR-3	**JOINTED ROCK**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 13.10.2021 | **Table No. 11**

Boring End : 14.10.2021 | **Bore-Hole No. 11**

Location | **G.W.T: 0.5 m**

Karapakkam | **Termination Depth:19.0 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
8	8	1.50	SPT-1	Sandy Silty **CLAY**	CI	0	38	62	38	18	20					2.54				
10	10	3.00	SPT-2	Sitly **CLAY**	CI				36	19	17				34		76	UCS	0.57	
18	19	4.50	SPT-3	Silty **SAND**	SM	0	84	16							16	2.63				
30	26	6.00	SPT-4	Silty Clayey **SAND**	SC	1	76	23	34	18	16									
34	28	7.50	SPT-5	Silty **SAND**	SM	0	73	27												
9	9	9.00	SPT-6	**CLAY**	CH				84	28	56				40	2.77				
12	12	10.50	SPT-7		CH				88	36	52						127			
17	17	12.00	SPT-8		CH				68	24	44					2.39		UCS	0.69	
59	37	13.50	SPT-9	Silty **SAND**	SM	0	73	27							14					
>100	>100	15.00-15.25	SPT-10	**Weathered Rock**	SM	9	65	26												
>100	>100	16.50-16.75	SPT-11		SM	7	73	20							18					
-	-	16.75-18.00	CR-1																	
-	-	18.00-19.00	CR-2																	

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 12.10.2021 | **Table No. 12**

Boring End : 13.10.2021 | **Bore-Hole No. 12**

Location | **G.W.T: 0.45 m**

Karapakkam | **Termination Depth:20.0 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
6	6	1.50	SPT-1	Silty **CLAY**	CH				57	23	34	37			37	2.77	70			
-	-	3.00	UDS-1	**CLAY**	CH				51	21	30							TA	0.52	
12	16	4.50	SPT-2	Silty **SAND**	SM	0	85	15							12	2.72				
14	17	6.00	SPT-3		SM	0	73	27										DS		31
22	20	7.50	SPT-4		SM	0	75	25								2.72				
12	14	9.00	SPT-5	Clayey **SAND**	SC	1	54	45	54	20	34									
14	14	10.50	SPT-6	**CLAY**	CH				77	20	57					2.63		UCS	0.81	
21	21	12.00	SPT-7		CH				50	23	27				34					
37	26	13.50	SPT-8	Silty **SAND**	SM	0	89	11							14	2.69		DS	0.24	23
59	36	15.00	SPT-9	Silty Gravelly **SAND**	SP	26	57	17												
>100	>100	16.50-16.73	SPT-10	**Weathered Rock**	SM	26	47	27							12					
-	-	17.50-19.00	CR-1																	
-	-	19.00-20.00	CR-2	**Jointed Rock**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 07.10.2021 | **Table No. 13**

Boring End : 08.10.2021 | **Bore-Hole No. 13**

Location | **G.W.T: 0.35 m**

Karapakkam | **Termination Depth:19.5 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
6	6	1.50	SPT-1	Silty **CLAY**	CH				61	19	42				48	2.53				
-	-	3.00	UDS-1		CH				57	20	37		1.27	1.67	31			UCS	0.41	
8	8	4.50	SPT-2		CI				47	21	26						105			
22	21	6.00	SPT-3	Clayey **SAND**	SC	1	73	26	30	13	17				19					
26	23	7.50	SPT-4	Silty **SAND**	SM	0	79	21								2.49				
6	6	9.00	SPT-5	**CLAY**	CH				72	26	46					2.41		UCS	0.34	
11	11	10.50	SPT-6		CH				74	23	51				48	2.42				
16	16	12.00	SPT-7		CH				69	32	37					2.43	57			
28	22	13.50	SPT-8	Silty **SAND**	SM	1	87	12												
>100	>100	15.00	SPT-9	**Weathered Rock**	SM	0	88	12							13			DS		40
>100	>100	16.50-16.55	SPT-10																	
-	-	16.55-18.00	CR-1																	
-	-	18.00-19.00	CR-2																	
-	-	19.00-19.50	CR-3	**Jointed Rock**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 09.10.2021 | **Table No. 14**

Boring End : 10.10.2021 | **Bore-Hole No. 14**

Location | **G.W.T: 0.4 m**

Karapakkam | **Termination Depth:19.0 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
6	6	1.50	SPT-1	**CLAY**	CH				56	31	25				31	2.44	52			
-	-	3.00	UDS-1		CI				43	21	22							UCS	0.8	
18	20	4.50	SPT-2	Clayey **SAND**	SC	0	82	18	27	14	13				15	2.61				
30	26	6.00	SPT-3		SC	0	76	24	33	14	19									
38	30	7.50	SPT-4	Silty **SAND**	SM	2	82	16							17	2.60		DS		37
13	13	9.00	SPT-5	**CLAY**	CH				66	25	41				33	2.42				
17	17	10.50	SPT-6		CH				64	32	32									
20	20	12.00	SPT-7		CH				56	25	31						50	UCS	1.12	
47	31	13.50	SPT-8	Silty Clayey **SAND**	SC	3	53	44	27	15	12									
>100	>100	15.00-15.22	SPT-9	**Weathered Rock**	SM	10	66	24	24	Non-Plastic					13			DS		40
-	-	16.00-17.50	CR-1																	
-	-	17.50.-18.50	CR-2	**Jointed Rock**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 11.10.2021 | **Table No. 15**

Boring End : 12.10.2021 | **Bore-Hole No. 15**

Location | **G.W.T: 0.45 m**

Karapakkam | **Termination Depth:19.0 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
2	2	1.50	SPT-1	**CLAY**	CH				63	21	42				42	2.46	60			
12	12	3.00	SPT-2		CH				61	22	39				44					
-	-	4.50	UDS-1		CH				85	37	48		1.3817	1.81	31			UCS	0.81	
23	22	6.00	SPT-3	Silty **SAND**	SM	0	82	18								2.59				
27	27	7.50	SPT-4	**CLAY**	CH				53	17	36				15	2.49				
12	12	9.00	SPT-5		CH				60	29	31						65	UCS	0.7	
30	30	10.50	SPT-6		CH				53	18	35				34					
32	24	12.00	SPT-7	Silty **SAND**	SM	0	68	32	Non plastic											
>100	>100	13.50-13.73	SPT-8	**Weathered Rock**	SM	8	74	18							12			DS		42
>100	>100	15.00-15.08	SPT-9																	
-	-	15.08-16.50	CR-1																	
-	-	16.50-18.00	CR-2																	
-	-	18.00-19.00	CR-3	**Jointed Rock**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 09.10.2021 | **Table No. 16**

Boring End : 09.10.2021 | **Bore-Hole No. 16**

Location | **G.W.T: 0.4 m**

Karapakkam | **Termination Depth:18.5 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
2	2	1.50	SPT-1	**CLAY**	CH				53	25	28				33	2.51				
-	-	3.00	UDS-1		CH				56	26	30		1.32	1.72	30			UCS	0.41	
6	6	4.50	SPT-2		CH				51	23	28				36					
22	22	6.00	SPT-3		CH				72	27	45					2.50	59			
30	30	7.50	SPT-4	Sandy **CLAY**	CH	0	45	55	57	23	34				28			UCS	1.30	
36	28	9.00	SPT-5	Clayey **SAND**	SC	0	55	45	52	19	33									
18	18	10.50	SPT-6	**CLAY**	CH				77	27	50					2.50	100			
20	20	12.00	SPT-7		CH															
26	26	13.50	SPT-8		CH				58	30	28				33			UCS	1.61	
71	71	15.00	SPT-9	Sandy **CLAY**	CH	0	47	53							21					
>100	>100	16.50-16.75	SPT-10	**Weathered Rock**	SC	17	56	27												
-	-	16.75-17.50	CR-1																	
-	-	17.50-18.50	CR-2	**Jointed Rock**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

GEO FOUNDATIONS & STRUCTURES PVT LTD

LABORATORY TEST RESULTS

Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Boring Start : 11.10.2021 | **Table No. 17**

Boring End : 12.10.2021 | **Bore-Hole No. 17**

Location | **G.W.T: 0.4 m**

Karapakkam | **Termination Depth:17.5 m**

Site Recorded N Value	Corrected N Value	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	WET DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
						GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT,%	PLASTIC LIMIT,%	PLASTICITY INDEX	SHRINKAGE LIMIT, %						TEST METHOD	C in Kg/cm²	Φ in degrees
5	5	1.50	SPT-1	**CLAY**	CH				73	24	49				32	2.36	67			
7	7	3.00	SPT-2		CH				65	17	48				42	2.42				
-	7	4.50	UDS-1		CH				58	21	37		1.26	1.69	34			UCS	0.60	
25	23	6.00	SPT-3	Clayey **SAND**	SC	0	76	24	30	15	15									
31	31	7.50	SPT-4	Sandy **CLAY**	CL				30	17	13				17	2.55				
9	9	9.00	SPT-5	**CLAY**	CH				96	39	57				44					
14	14	10.50	SPT-6		CH				86	33	53					2.36	167	UCS	0.80	
18	18	12.00	SPT-7		CH				50	18	32									
61	38	13.50	SPT-8	Silty **SAND**	SM	3	83	14	20	Non-Plastic										
>100	>100	15.00-15.42	SPT-9	**Weathered Rock**	SM	3	84	13							12			DS		40
-	-	15.50-16.50	CR-1																	
-	-	16.50-17.50	CR-2	**Jointed Rock**																

NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS - Direct Shear
TA - Tri Axial test

APPENDIX-III

CHEMICAL ANALYSIS OF GROUND WATER & SOIL

GEO FOUNDATIONS & STRUCTURES PVT.LTD.

Project. No.	**: 21-990**
Name of Project	**: Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.**
Ref. No.	**: SI/CHN/21/990/01**

Table No. 18

CHEMICAL ANALYSIS OF GROUND WATER

	Limits for using the ground water for mixing concrete	**400 mg/l**	**I.2000 mg/l for Plain concrete II. 500 mg/l for reinforced concrete**	**6.0 Min**
Sl. No.	**Borehole No**	**Sulphate as SO_3 mg/l**	**Chloride as Cl mg/l**	**pH @ 25 °C**
1	BH 1	1424	5864	6.53
2	BH 2	940	4612	6.52
3	BH 3	526	4491	6.41
4	BH 4	728	5211	6.47
5	BH 5	962	4853	6.57
6	BH 6	962	4632	6.54
7	BH 7	1137	4963	6.57
8	BH 8	962	4632	6.54
9	BH 9	554	4533	6.58
10	BH 10	713	5584	6.57
11	BH 11	761	3600	6.58
12	BH 12	613	4111	6.53
13	BH 13	1344	5564	6.57
14	BH 14	630	3961	6.58
15	BH 15	938	3888	6.52
16	BH 16	1424	4856	6.51
17	BH 17	5925	3881	6.54

GEO FOUNDATIONS & STRUCTURES PVT.LTD.

CHEMICAL ANALYSIS OF SOIL

Project. No.	**: 21-990**
Name of Project	**: Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.**
Ref. No.	**: SI/CHN/21/990/01**

Table No. 19

Sl. No.	Bore Hole No.	Depth in (m)	Chloride as Cl (%)	Sulphate as SO_4 (%)
1	BH 1	3	0.27	1.1
2	BH 2	3	0.27	0.79
3	BH 3	6.5	0.15	0.14
4	BH 4	3	0.26	1.00
5	BH 5	3	0.29	0.78
6	BH 6	9	0.22	0.23
7	BH 7	6.5	0.15	0.11
8	BH 8	6.5	0.16	0.13
9	BH 9	3	0.27	0.79
10	BH 10	6.5	0.17	0.12
11	BH 11	9	0.21	0.22
12	BH 12	3	0.28	1.2
13	BH 13	6.5	0.15	0.13
14	BH 14	3	0.27	1.1
15	BH 15	9	0.2	0.21
16	BH 16	3	0.29	0.80
17	BH 17	3	0.29	1.20

APPENDIX- IV

ROCK TEST RESULTS

GEO FOUNDATIONS & STRUCTURES PVT. LTD.

LAB TEST RESULTS ON ROCK

Project No. :	21-990		Table No. : 20

Name of Project : Soil Investigation for the Proposed Residential Development at Karapakkam, OMR, Chennai.

Sl.No	Bore Hole No.	Test Depth	Dry Density,	Porosity	Point Load Strength	Uniaxial Compressive Strength
		m	gm/cc		Kg/cm²	Kg/cm²
1	BH 1	16.50-17.50	2.74	0.0025	1079	-
2	BH 2	17.50-18.50	2.74	0.0026	1057	1256
3	BH 3	17.00-18.00	2.83	0.0024	1146	1310
4	BH 4	16.57-18.00	2.75	0.003	-	-
5	BH 5	18.50-19.50	2.76	0.0021	1298	1458
6	BH 6	16.50-17.50	2.75	0.0016	1340	1616
7	BH 7	16.00-17.00	2.74	0.002	1216	1421
8	BH 8	17.00-18.00	2.74	0.0028	-	-
9	BH 9	17.50-18.00	2.75	0.0026	1011	-
10	BH 10	18.50-19.50	2.76	0.0023	1196	1328
11	BH 11	18.00-19.00	2.75	0.0021	1044	-
12	BH 12	19.00-20.00	2.74	0.0024	1106	-
13	BH 13	19.00-19.50	2.72	0.0026	1121	1359
14	BH 14	17.50-18.50	2.75	0.0023	1103	1312
15	BH 15	18.00-19.00	2.74	0.0021	1174	-
16	BH 16	17.50-18.50	2.73	0.0024	1118	1347
17	BH 17	16.50-17.50	2.7	0.003	1098	1269

APPENDIX- V

FIELD PERMEABILITY TEST

2. FIELD PERMEABILITY TEST

2.1 OBJECT OF INVESTIGATION

The tests were conducted at seven different locations as per the specification to record the in situ permeability of soils which can be used for computing the drainage properties and settlement of the building to be proposed.

2.2 THE EQUIPMENT

The Variable (falling) head field permeability test equipment comprises of the following:
One main unit with water pipe of suitable length, suitable type of packers in size of borehole dia and a stop watch.

2.3 TEST PROCEDURE

The preliminary arrangements were done i.e., the borehole drilled or bored up to a depth of two meters at the field permeability test location and the borehole was thoroughly flushed with clear water before the test.

After the preliminary arrangements, the water pipe should be fixed at the desired depth of 2metres so as to enable the testing of the full section of the hole. The water pipe was filled with water up to its top and the rate of fall of the water inside the pipe was recorded at an interval of each meter.

2.4 RECORDS AND CALCULATIONS

The field observation and test results were then tabulated as given in table no: 2.4.1

Sample calculation for coefficient of permeability

Test no	:	FPT-4
Borehole Number	:	BH 9
Location	:	Karapakkam
Depth of borehole below ground level	:	18.00 m
Radius of hole, R (mm)	:	50 mm
Diameter of intake pipe (Stand pipe), d	:	18 mm
Length of test zone, L	:	1000 mm
Head of water in the stand pipe at time t_1 above water table, h_1	:	850 mm
Head of water in the stand pipe at time t_2 above water table, h_2	:	650 mm
Time of start, t_1	:	3.35 P.M on 13/10/21
Time of end, t_2	:	6.45 P.M on 13/10/21

The coefficient of permeability (k) is calculated from the formula given below:

$$K = \left(\frac{d^2}{8L}\right) \log_e \left(\frac{L}{R}\right) \left(\frac{\log_e h1/h2}{t_2 - t_1}\right)$$

Where,

K = 0.00004 X 1.3010299 X 0.0006263

= 0.000000033 m/min

K = 0.00000055 mm/sec

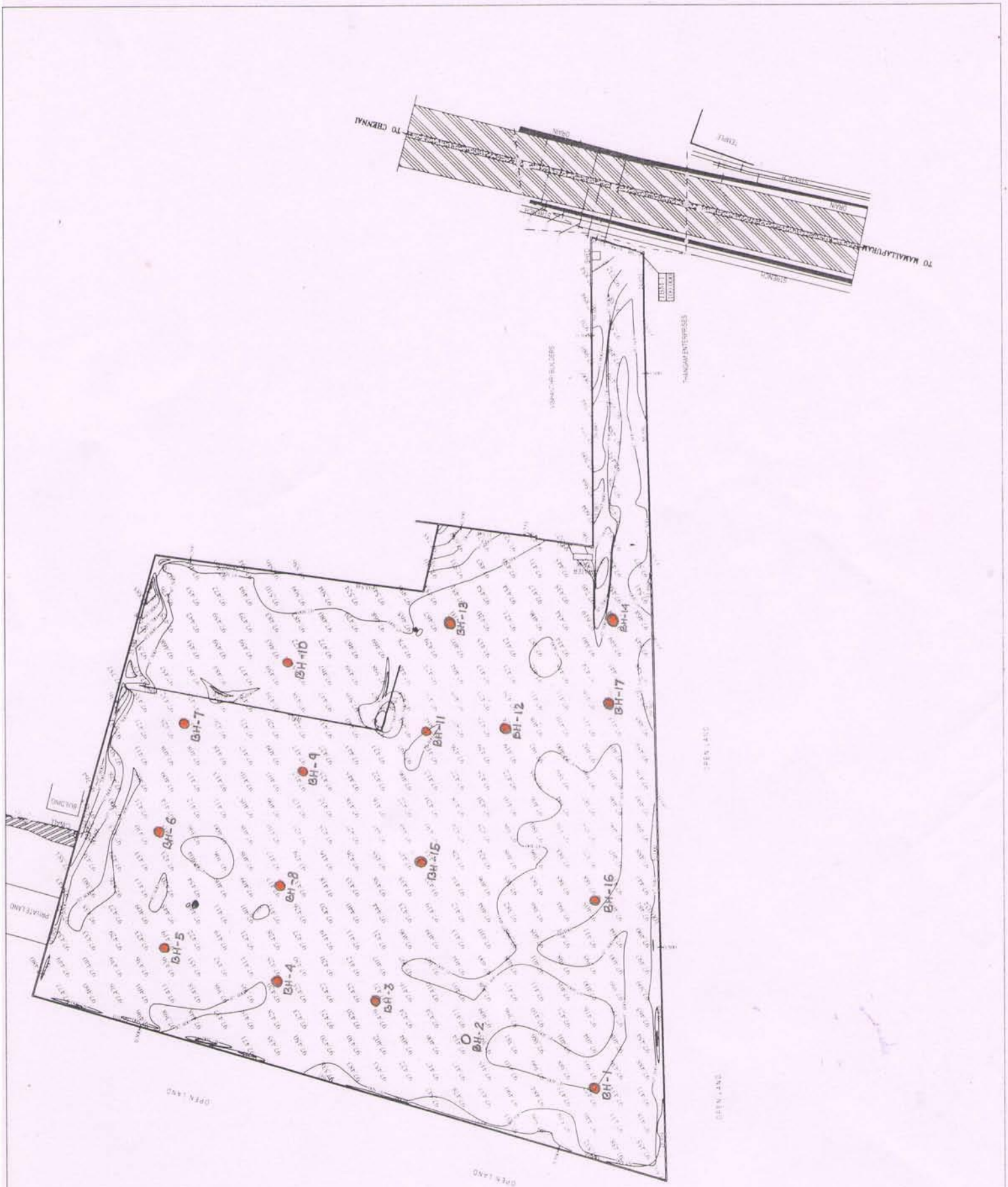
FALLING HEAD PERMEABILITY TEST

Table No: 2.4.1

TEST NO	B.H No	METHOD	Coefficient of permeability, k(mm/sec)
FPT-1	2	PUMP-IN	0.00000012
FPT-2	4	PUMP-IN	0.00000059
FPT-3	6	PUMP-IN	0.00000095
FPT-4	9	PUMP-IN	0.00000055
FPT-5	11	PUMP-IN	0.00000063
FPT-6	13	PUMP-IN	0.00000064
FPT-7	14	PUMP-IN	0.00000090

APPENDIX- VI

BOREHOLES LOCATION DRAWING


TO CHENNAI
TO KAKKALAPUDAM
OPEN LAND
PRIVATE LAND
BH-1
BH-2
BH-3
BH-4
BH-5
BH-6
BH-7
BH-8
BH-9
BH-10
BH-11
BH-12
BH-13
BH-14
BH-15
BH-16
BH-17



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.

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

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Compliance & Special Services

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



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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

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