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SOIL INVESTIGATION REPORT

CLIENT

M/S. G K SHETTY BUILDERS PVT LTD

CHETPET, CHENNAI

PROJECT LOCATION

SURVEY No. 248/2, T.S.No.28/2, PADI VILLAGE, BLOCK-72

AMBATTUR TALUK, CHENNAI

REPORT NO.: SI/CHN/23/1704/01

MARCH 2023

GEO FOUNDATIONS & STRUCTURES PVT LTD

GEO TECHNICAL DIVISION CHENNAI

Email: soil@geo.net.in

NAME OF PROJECT

SOIL INVESTIGATION FOR THE PROPOSED STRUCTURE (G+5 FLOORS) AT LAND COMPRISED IN SURVEY 248/2, PADI VILLAGE, AMBATTUR TALUK (AS PER THE DOCUMENT) AND PRESENTLY AS PER COMPUTERIZED TOWN SURVEY LAND REGISTER COMPRISED IN T.S.No.28/2, PADI VILLAGE, BLOCK-72, AMBATTUR TALUK, CHENNAI.

CLIENT

M/S. G K SHETTY BUILDERS PVT LTD
No. 3, CLUB ROAD,
CHETPET, CHENNAI - 600 031

GEOTECHNICAL CONSULTANT

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

PROJECT No.: 1704					
Rev. No.	**Date**	**Description**	**Created by**	**Verified by**	**Approved by**
FR/01	25.03.2023	FINAL REPORT	NAMRITHA RAVI M.Sc (UK)	A. SURESH KUMAR, M. Tech - (Geotechnical)	DR. K. MUTHUKRISHNAIAH M. Tech., Ph.D.,
			Engineer	General Manager	Chief Consultant

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APPENDIXES

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SOIL INVESTIGATION REPORT

1.0 INTRODUCTION

1.1 The work of "Soil Investigation for the Proposed (G+5 Floors) Structure at land comprised in Survey 248/2, Padi Village, Ambattur Taluk (as per the document) and presently as per computerized Town Survey Land Register comprised in T.S.No.28/2, Padi Village, Block-72, Ambattur Taluk, Chennai District." was entrusted to **M/s. Geo Foundations & Structures Pvt. Ltd.,** Adyar, Chennai – 600 020, by **M/s. G.K. Shetty Builders Pvt. Ltd,** Club Road, Chetpet, Chennai- 600 031.

1.2 The soil investigation (field investigation) works were carried out during **5th March to 12th March 2023**. This report summarizes the results of the soil investigation, and presents recommendations for suitable type of foundations for the proposed (G+5 Floors) structure.

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 (G+5 Floors) structure. The study includes identification of suitable type of foundations and assessment of safe bearing capacities for the proposed (G+5 Floors) structure.

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 **7** bore holes of 150 mm diameter with Calyx drilling equipments through sand, silt, clay& up to hard stratum (where 3 consecutive SPT N>100 are obtained).

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 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 on clayey and silty soil samples:

(i) Liquid limit

(ii) Plastic limit

(iii) Shrinkage limit

(c) Moisture content

(d) Dry and bulk density

(e) Specific Gravity

(f) Free Swell Index

(g) Triaxial / Direct Shear Test

(h) Unconfined Compressive Strength

(i) Chemical Analysis of Ground Water

3.5 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 **Seven** bore holes of 150 mm diameter were bored to a maximum depth up to **32 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 m depth intervals, from the existing ground level, up to 5 m, 1.5 m depth intervals, beyond 5 m, up to termination depth in BH 1. In BH 2, BH 3, BH 4 & BH 6: at 1 m depth intervals, from the existing ground level, up to 5 m, 1.5 m depth intervals, up to 27.5 m, 1 m depth intervals, up to termination depth. In BH 5, at 1 m depth intervals, from the existing ground level, up to 5 m, 1.5 m depth intervals, up to 30 m, 1 m depth interval, up to

termination depth. In BH 7, at 1 m depth intervals, from the existing ground level, up to 5 m, 1.5 m depth intervals, up to 26 m, 1 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 m depth intervals, from the existing ground level, up to 5 m, 1.5 m depth intervals, beyond 5 m, up to termination depth in BH 1. In BH 2, 3, 4 & 6, at 1 m depth intervals, from the existing ground level, up to 5 m, 1.5 m depth intervals, up to 27.5 m, 1 m depth interval, up to termination depth. In BH 5, at 1 m depth intervals, from the existing ground level, up to 5 m, 1.5 m depth intervals, up to 30 m, 1 m depth interval, up to termination depth. In BH 7, at 1 m depth intervals, from the existing ground level, up to 5 m, 1.5 m depth intervals, up to 26 m, 1 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 was 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 was 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 07 **(Appendix I).**

5.0 LABORATORY INVESTIGATION

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

(a) Grain size analysis

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

(i) Liquid limit

(ii) Plastic limit

(c) Natural Moisture Content

(d) Dry & Bulk density

(e) Specific Gravity

(f) Free Swell Index

(g) Direct Shear Test

(h)Triaxial Test

(i) Unconfined Compressive Strength

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 7 **(Appendix II).**

The results of the chemical analysis of ground water are presented in Table No.8 **(Appendix III).**

6.0 SOIL PROFILE

In borehole BH 1, Dense silty sand occurs from existing ground level up to 2 m, followed by medium dense silty sand up to 4 m, medium dense sand up to 11 m, medium stiff sandy clay of high plasticity up to 12.5 m, stiff sandy clay of high plasticity up to 14 m, medium dense clayey sand up to 17 m, very stiff sandy gravelly clay of medium plasticity up to 18.5 m, very hard sandy clay of high plasticty up to 21.5 m, medium dense silty sand up to 23 m, medium dense sand up to 24.5 m, medium dense silty sand up to 26 m, very hard sandy clay of low plasticity up to 29 m, followed by very hard sandy clay of medium plasticity up to **32 m,** at which depth the bore hole was terminated.

In borehole BH 2, Dense silty sand occurs from existing ground level up to 2 m, followed by stiff sandy clay of low plasticity up to 3 m, stiff sandy clay of medium plasticity up to 4 m, medium dense clayey sand up to 5 m, medium dense sand up to 6.5 m, medium dense silty sand up to 8 m, medium dense sand up to 11 m, soft sandy clay of high plasticity up to 12.5 m, medium stiff sandy clay of medium plasticity up to 15.5 m, very loose clayey sand

up to 18.5 m, very stiff sandy gravelly clay of high plasticity up to 20 m, very stiff sandy clay of high plasticity up to 21.5 m, medium dense silty sand up to 26 m, very hard sandy clay of medium plasticity up to 27.5 m, followed by weathered rock at **29.5 m,** at which depth the bore hole was terminated.

In borehole BH 3, Dense silty sand occurs from existing ground level up to 2 m, followed by medium dense silty gravelly sand up to 3 m, medium dense silty sand up to 5 m, medium dense clayey sand up to 6.5 m, medium dense silty sand up to 9.5 m, medium dense sand up to 11 m, very loose clayey sand up to 12.5 m, very loose gravelly silty sand up to 14 m, medium stiff sandy clay of high plasticity up to 18.5 m, very stiff clay of high plasticity up to 20 m, very stiff sandy clay of high plasticity up to 21.5 m, medium dense silty gravelly sand up to 23 m, medium dense silty sand up to 24.5 m, very hard sandy clay of high plasticity up to 27.5 m, followed by weathered rock at **29.5 m,** at which depth the bore hole was terminated.

In borehole BH 4, Medium dense silty sand occurs from existing ground level up to 2 m, followed by medium dense sand up to 11 m, very loose clayey sand up to 12.5 m, loose clayey sand up to 14 m, very loose clayey sand up to 15.5 m, medium stiff sandy clay of high plasticity up to 17 m, stiff sandy clay of high plasticity up to 18.5 m, very stiff sandy clay of high plasticity up to 21.5 m, medium dense silty sand up to 23 m, medium dense clayey sand up to 24.5 m, dense silty sand up to 26 m, dense sand up to 27.5 m, followed by weathered rock up to **29.5 m,** at which depth the bore hole was terminated.

In borehole BH 5, hard gravelly sandy clay of medium plasticity occurs from existing ground level up to 2 m, followed medium dense sand up to 4 m, stiff sandy clay of medium plasticity up to 5 m, medium dense silty sand up to 6.5 m, medium dense sand up to 11 m, medium stiff sandy clay of medium plasticty up to 12.5 m, medium stiff sandy clay of high plasticity up to 14 m, medium dense clayey sand up to 17 m, hard sandy clay of high plasticity up to 18.5 m, very stiff clay of high plasticity up to 21.5 m, medium dense sand up

to 23 m, medium dense silty sand up to 26 m, medium dense sand up to 27.5 m, hard sandy clay of low plasticity up to 30 m, followed by weathered rock up to **32 m,** at which depth the bore hole was terminated.

In borehole BH 6, Very dense silty sand occurs from existing ground level up to 2 m, followed by stiff sandy clay of low plasticity up to 4 m, medium dense sand up to 9.5 m, medium dense silty sand up to 11 m, , medium dense sand up to 12.5 m, medium dense silty sand up to 14 m, loose clayey sand up to 15.5 m, medium dense clayey sand up to 18.5 m, very stiff sandy clay of high plasticity up to 20 m, very stiff sandy clay of medium plasticity up to 21.5 m, medium dense silty sand up to 23 m, medium dense sand up to 26 m, dense sand up to 27.5 m, followed by weathered rock up to **29.5 m,** at which depth the bore hole was terminated.

In borehole BH 7, Medium dense silty sand occurs from existing ground level up to 2 m, followed by medium dense sand up to 6.5 m, loose sand up to 8 m, medium dense sand up to 11 m, medium stiff sandy clay of medium plasticity up to 12.5 m, medium stiff clay of high plasticity up to 14 m, loose clayey sand up to 18.5 m, very stiff sandy clay of high plasticity up to 20 m, hard gravelly sandy clay of high plasticity up to 21.5 m, very stiff sandy clay of high plasticity up to 23 m, medium dense sand up to 24.5 m, dense sand up to 26 m, followed by weathered rock up to **28 m,** at which depth the bore hole was terminated.

7.0 GROUND WATER TABLE

Ground water levels were met at a depth ranging from **2.7 m to 3.8 m** from the existing ground level at the time of investigation in the 7 boreholes, during continuous boring from **05.03.2023 to 12.03.2023.**

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, considering very low SPT N values varying from 3 to 8 at some depths between 6.5 m to 18.5 m, from the below existing ground level, the following recommendations are made for suitable type of foundations for the proposed (G+5 Floors) structure.

8.1 <u>Alternative</u> I: Pile Foundations (For very sensitive and heavily loaded structures)

8.1.1 Bored cast in situ concrete pile foundations are recommended.

8.1.2 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)

8.1.3 The pile bore may be terminated at a depth of minimum four times diameter of the pile in to hard strata (where five consecutive SPT 'N' values of more than 100 are obtained in each test at depth intervals of one pile diameter).

8.1.4 To satisfy the above criterion, the pile length may be of the order of **31 m** from the existing ground level.

8.1.5 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.

8.1.6 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.

8.1.7 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.**

<u>Table A</u>

Approximate Length of Pile from G.L (m)	**Pile Diameter (mm)**	**Recommended Safe Vertical Load Capacity (T)**
31	500	100
	600	140
	750	200

8.1.8 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

Nγ 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 = $(A_P. Nc. Cp+\alpha. C.A_S)/f$

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 <u>Alternative II</u>: Open Foundations (For Security Office & Other lightly loaded structure)

8.2.1 Open Foundations (individual column footings or combined footings if there are two or more columns close to each other, or Strip Raft combining each row of columns, if each row of columns are close to each other when compared to the distance or span between the rows of columns, or raft foundation) are recommended.

8.2.2 Excavation shall be made up to a depth of at least **2.5 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.

8.2.3 After thorough compaction of the bottom of excavation, PCC for the foundations can be laid at **2.5 m** depth below the ground level which existed at the time of soil investigation.

8.2.4 A safe bearing capacity of **9 t/m²** is recommended under the foundations. However, the width of any column footing or strip raft shall not be less than 1 m.

8.2.5 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 PCC, 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.

9.0 CHEMICAL COMPOSITION OF GROUND WATER

The results of chemical analysis on the ground water sample collected from the borehole, presented in Table No.8 **(Appendix – III)** show that:

9.1 Since the pH value is more than 6, the ground water, in terms of pH value, is suitable for mixing concrete as per Clause 5.4.2 of Indian Standard: 456-2000, (Reaffirmed 2021), plain and reinforced concrete – code of practice (Fourth Revision).

9.2 The chloride content is less than the permissible upper limit of 500 mg/l. for use of ground water for mixing in concrete for RCC, as per IS: 456-2000, (Reaffirmed 2021). Therefore, in terms of chloride content in the ground water, the ground water is suitable for mixing concrete for RCC.

9.3 The sulphate content (expressed as SO_3) is less than the permissible upper limit of 400 mg/l for use of ground water for mixing in concrete, as per IS: 456-2000 (Reaffirmed 2021). Therefore, in terms of sulphate content, the ground water is suitable for mixing concrete for RCC. The sulphate content (expressed as SO_3) is less than 300 mg/l which comes under Class 1 of "Requirements for concrete exposed to sulphate attack", as per IS:456-2000 (Reaffirmed 2021), Table 4. For this Class, the requirements are: Ordinary Portland cement or Portland slag cement or Portland pozzolana cement can be used with a minimum cement content of 280 kg/ m^3 of concrete and with a maximum water: cement ratio of 0.55"

9.4 Hence, the ground water is suitable for mixing concrete for Construction purpose.

10.0 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.

Dr. K. Muthukrishnaiah BE (Hons), M.Tech., Ph.D.,
(Professor & Head, Ocean Engineering Dept. IIT Madras)(Rtd),
(Chief Consultant)

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

APPENDIX-I

BORELOGS

Project : Soil Investigation for the Proposed Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 1
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.6 m from G.L on 13.03.2023
UTM Co-ordinate	:
Termination Depth	: 32.0 m

Drilling Hole Record-BH 1

Fig No. 01

Reduced Level	:	100.3
Start Date	:	10.03.2023
End Date	:	12.03.2023

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
Silty **SAND** (SM)	Grey	Medium Dense, Granular				SPT-1	SS	1.00	1.00-1.45	19	12	14	26			
						SPT-2	SS	2.00	2.00-2.45	5	8	11	19			
						UDS-1	OT	2.50	2.50-2.95	-	-	-	-			
	Brown					SPT-3	SS	3.00	3.00-3.45	5	7	10	17			G.W.L
			4.00	96.30												
SAND (SP)	Brown	Medium Dense, Granular				SPT-4	SS	4.00	4.00-4.45	4	6	9	15			
						SPT-5	SS	5.00	5.00-5.45	3	4	7	11			
	Grey					SPT-6	SS	6.50	6.50-6.95	6	6	9	15			
						SPT-7	SS	8.00	8.00-8.45	5	5	9	14			
						SPT-8	SS	9.50	9.50-9.95	7	7	6	13			
			11.00	89.30												
Dark Greyish, Medium Stiff, Sandy **CLAY** (CH)						SPT-9	SS	11.00	11.00-11.45	2	2	4	6			

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

G.W.L:3.6 m from G.L on 13.03.2023	No of SPT: 23 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 1
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.6 m from G.L on 13.03.2023
UTM Co-ordinate	:
Termination Depth	: 32.0 m

Drilling Hole Record-BH 1

Fig No. 01

Reduced Level	:	100.3
Start Date	:	10.03.2023
End Date	:	12.03.2023

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
Dark Greyish, Medium Stiff, Sandy **CLAY** (CH)			12.50	87.80		SPT-10	SS	12.50	12.50-12.95	3	5	6	11				
Sandy **CLAY** (CH)	Drak Grey	Stiff, Layered	14.00	86.30		SPT-11	SS	14.00	14.00-14.45	5	7	8	15				
Clayey **SAND** (SC)	Drak Grey	Medium Dense, Granular	17.00	83.30		SPT-12	SS	15.50	15.50-15.95	4	6	8	14				
Sandy Gravelly **CLAY** (CI)	Grey	Very Stiff, Layered	18.50	81.80		SPT-13	SS	17.00	17.00-17.45	9	13	14	27				
Snady **CLAY** (CH)		Hard, Layered	21.50	78.80		SPT-14	SS	18.50	18.50-18.95	13	14	19	33				
						SPT-15	SS	20.00	20.00-20.45	17	20	25	45				
Silty **SAND** (SM)	Grey	Medium Dense, Granular	23.00	77.30		SPT-16	SS	21.50	21.50-21.95	7	9	11	20				

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

G.W.L:3.6 m from G.L on 13.03.2023	No of SPT: 23 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 1
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.6 m from G.L on 13.03.2023
UTM Co-ordinate	:
Termination Depth	: 32.0 m

Drilling Hole Record-BH 1

Fig No. 01

Reduced Level	:	100.3
Start Date	:	10.03.2023
End Date	:	12.03.2023

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
SAND (SP)	Grey	Dense, Granular	24.50	75.80		SPT-17	SS	23.00	23.00-23.45	15	16	19	35			
						SPT-18	SS	24.50	24.50-24.95	13	15	18	33			
Silty **SAND** (SM)	Grey	Dense, Granular	26.00	74.30		SPT-19	SS	26.00	26.00-26.45	17	16	31	47			
Sandy **CLAY** (CL)	Grey	Hard, Layered	29.00	71.30		SPT-20	SS	27.50	27.50-27.95	19	22	36	58			
						SPT-21	SS	29.00	29.00-29.26	35	>50	-	>100			50/11 cm Penetration
Sandy **CLAY** (CI)	Grey	Hard, Layered	32.00	68.30		SPT-22	SS	30.50	30.50-30.73	38	>50	-	>100			50/08 cm Penetration
						SPT-23	SS	32.00	32.00-32.06	>50	-	-	>100			50/06 cm Penetration

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

G.W.L: 3.6 m from G.L on 13.03.2023	No of SPT: 23 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 2
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.8 m from G.L on 13.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 2

Fig No. 02

Reduced Level	:	100.3
Start Date	:	10.03.2023
End Date	:	12.03.2023

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
Gravelly Silty **SAND** (SM)	Brown	Medium Dense, Granular	2.00	98.30		SPT-1	SS	1.00	1.00-1.45	10	9	11	20				
						SPT-2	SS	2.00	2.00-2.45	4	5	5	10				
Sandy **CLAY** (CL)	Brown	Stiff, Layered				UDS-1	OT	2.50	2.50-2.95	-	-	-	-				
Sandy **CLAY** (CI)						SPT-3	SS	3.00	3.00-3.45	5	5	6	11				G.W.L
			4.00	93.30													
Brownish, Medium Dense, Clayey **SAND** (SC)						SPT-4	SS	4.00	4.00-4.45	5	5	6	11				
			5.00	95.30		SPT-5	SS	5.00	5.00-5.45	7	9	11	20				
SAND (SP)	Brown	Medium Dense, Granular	6.50	93.80		SPT-6	SS	6.50	6.50-6.95	6	8	10	18				
Silty **SAND** (SM)	Brown	Medium Dense, Granular	8.00	92.30		SPT-7	SS	8.00	8.00-8.45	7	8	11	19				
SAND (SP)	Grey	Medium Dense, Granular				SPT-8	SS	9.50	9.50-9.95	8	9	12	21				
			11.00	89.30		SPT-9	SS	11.00	11.00-11.45	2	2	2	4				
Dark Greyish, Soft, Sandy **CLAY** (CH)																	

G.W.L: 3.8 m from G.L on 13.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 2
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.8 m from G.L on 13.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 2

Fig No. 02

Reduced Level	:	100.3
Start Date	:	10.03.2023
End Date	:	12.03.2023

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
Sandy **CLAY** (CH)	Drak Grey	Soft, Layered	12.50	87.80		SPT-10	SS	12.50	12.50-12.95	1	2	3	5			
Sandy **CLAY** (CI)		Medium Stiff, Layered	15.50	84.80		SPT-11	SS	14.00	14.00-14.45	2	2	3	5			
Clayey **SAND** (SC)	Grey	Very Loose, Granular	18.50	81.80		SPT-12	SS	15.50	15.50-15.95	1	2	1	3			
						SPT-13	SS	17.00	17.00-17.45	1	1	2	3			
Sandy Gravelly **CLAY** (CH)	Grey	Very Stiff, Layered	20.00	80.30		SPT-14	SS	18.50	18.50-18.95	6	9	12	21			
Sandy **CLAY** (CH)	Grey	Very Stiff, Layered	21.50	78.80		SPT-15	SS	20.00	20.00-20.45	8	11	14	25			
Silty **SAND** (SM)	Grey	Medium Dense, Granular				SPT-16	SS	21.50	21.50-21.95	8	10	11	21			

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

G.W.L: 3.8 m from G.L on 13.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 2
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.8 m from G.L on 13.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 2

Fig No. 02

Reduced Level	:	100.3
Start Date	:	10.03.2023
End Date	:	12.03.2023

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 **SAND** (SM)	Grey	Dense, Granular	24.50	75.80	SPT-17	SS	23.00	23.00-23.45	14	16	17	33			
		Medium Dense, Granular	26.00	74.30	SPT-18	SS	24.50	24.50-24.95	8	9	12	21			
Sandy **CLAY** (CI)	Grey	Hard, Layered	27.50	72.80	SPT-19	SS	26.00	26.00-26.45	18	25	18	43			
Weathered Rock			29.50	70.80	SPT-20	SS	27.50	27.50-27.91	15	19	>50	>100			50/11 cm Penetration
					SPT-21	SS	28.50	28.50-28.58	>50	-	-	>100			50/08 cm Penetration
					SPT-22	SS	29.50	29.50-29.55	>50	-	-	>100			50/05 cm Penetration

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

G.W.L: 3.8 m from G.L on 13.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 3
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.6 m from G.L on 11.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 3

Fig No. 03

Reduced Level	:	100.3
Start Date	:	08.03.2023
End Date	:	10.03.2023

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 **SAND** (SM)	Brown	Medium Dense, Granular			SPT-1	SS	1.00	1.00-1.45	10	13	10	23			
			2.00	98.30	SPT-2	SS	2.00	2.00-2.45	5	4	4	8			
Silty Gravelly **SAND** (SP)	Brown	Loose, Granular	3.00	97.30	UDS-1	OT	2.50	2.50-2.95	-	-	-	-			
					SPT-3	SS	3.00	3.00-3.45	6	6	6	12			G.W.L
Brownish, Medium Dense, Silty **SAND** (SM)			4.00	96.30	SPT-4	SS	4.00	4.00-4.45	6	4	6	10			
Clayey **SAND** (SC)	Grey	Medium Dense, Granular			SPT-5	SS	5.00	5.00-5.45	5	8	5	13			
			6.50	93.80	SPT-6	SS	6.50	6.50-6.95	7	7	11	18			
Silty **SAND** (SM)	Grey	Medium Dense, Granular			SPT-7	SS	8.00	8.00-8.45	8	7	12	19			
			9.50	90.80	SPT-8	SS	9.50	9.50-9.95	8	10	14	24			
SAND (SP)	Grey	Medium Dense, Granular	11.00	89.30	SPT-9	SS	11.00	11.00-11.45	1	2	1	3			
Dark Greyish, Very Loose, Clayey **SAND** (SC)															

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

G.W.L: 3.6 m from G.L on 11.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil

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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 3
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.6 m from G.L on 11.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 3

Fig No. 03

Reduced Level	:	100.3
Start Date	:	08.03.2023
End Date	:	10.03.2023

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
Dark Greyish, Very Loose, Clayey **SAND** (SC)			12.50	87.80		SPT-10	SS	12.50	12.50-12.95	2	2	2	4				
Gravelly Silty **SAND** (SM)	Dark Grey	Very Loose, Granular	14.00	86.30		SPT-11	SS	14.00	14.00-14.45	2	2	3	5				
Sandy **CLAY** (CH)	Dark Grey	Medium Stiff, Layered				SPT-12	SS	15.50	15.50-15.95	2	3	3	6				
						SPT-13	SS	17.00	17.00-17.45	2	3	4	7				
	Grey		18.50	81.80		SPT-14	SS	18.50	18.50-18.95	9	11	13	24				
CLAY (CH)	Grey	Very Stiff, Layered	20.00	80.30		SPT-15	SS	20.00	20.00-20.45	8	10	15	25				
Sandy **CLAY** (CH)	Grey	Very Stiff, Layered	21.50	78.80		SPT-16	SS	21.50	21.50-21.95	6	9	13	22				
Silty Gravelly **SAND** (SP)	Grey	Medium Dense, Granular															

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

G.W.L: 3.6 m from G.L on 11.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 3
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.6 m from G.L on 11.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 3

Fig No. 03

Reduced Level	:	100.3
Start Date	:	08.03.2023
End Date	:	10.03.2023

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 **SAND** (SM)	Grey	Medium Dense, Granular	24.50	75.80		SPT-17	SS	23.00	23.00-23.45	8	11	14	25				
						SPT-18	SS	24.50	24.50-24.95	15	15	26	41				
Sandy **CLAY** (CH)	Grey	Hard, Layered	27.50	72.80		SPT-19	SS	26.00	26.00-26.45	15	17	29	46				
						SPT-20	SS	27.50	27.50-27.62	>50	-	-	>100				50/12 cm Penetration
Weathered Rock						SPT-21	SS	28.50	28.50-28.74	41	>50	-	>100				50/09 cm Penetration
			29.50	70.80		SPT-22	SS	29.50	29.50-29.73	48	>50	-	>100				50/08 cm Penetration

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

G.W.L: 3.6 m from G.L on 11.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 4
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.5 m from G.L on 08.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 4

Fig No. 04

Reduced Level	:	100.3
Start Date	:	06.03.2023
End Date	:	07.03.2023

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 **SAND** (SM)	Brown	Medium Dense, Granular	2.00	98.30		SPT-1	SS	1.00	1.00-1.45	9	9	10	19				
						SPT-2	SS	2.00	2.00-2.45	8	10	11	21				
						UDS-1	OT	2.50	2.50-2.95	-	-	-	-				
						SPT-3	SS	3.00	3.00-3.45	6	8	8	16				G.W.L
SAND (SP)	Brown					SPT-4	SS	4.00	4.00-4.45	6	7	9	16				
						SPT-5	SS	5.00	5.00-5.45	5	7	8	15				
	Grey	Medium Dense, Granular				SPT-6	SS	6.50	6.50-6.95	5	6	6	12				
						SPT-7	SS	8.00	8.00-8.45	6	7	7	14				
						SPT-8	SS	9.50	9.50-9.95	7	8	8	16				
			11.00	89.30		SPT-9	SS	11.00	11.00-11.45	2	2	2	4				
Greyish, Very Loose, Clayey **SAND** (SC)																	

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

G.W.L: 3.5 m from G.L on 08.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 4
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.5 m from G.L on 08.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 4

Fig No. 04

Reduced Level	:	100.3
Start Date	:	06.03.2023
End Date	:	07.03.2023

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
Clayey **SAND** (SC)	Grey	Very Loose, Granular	12.50	87.80	SPT-10	SS	12.50	12.50-12.95	1	2	3	5			
		Loose, Granular	14.00	86.30	SPT-11	SS	14.00	14.00-14.45	2	1	2	3			
	Drak Grey	Very Loose, Granular	15.50	84.80	SPT-12	SS	15.50	15.50-15.95	2	3	3	6			
Sandy **CLAY** (CH)	Drak Grey	Medium Stiff, Layerd	17.00	83.30	SPT-13	SS	17.00	17.00-17.45	2	3	8	11			
	Drak Grey	Stiff, Layered	18.50	81.80	SPT-14	SS	18.50	18.50-18.95	9	11	12	23			
	Grey	Very Stiff, Layered	20.00	80.30	SPT-15	SS	20.00	20.00-20.45	10	13	27	40			
		Hard, Layered	21.50	78.80	SPT-16	SS	21.50	21.50-21.95	8	10	12	22			
Silty **SAND** (SM)	Grey	Medium Dense, Granular													

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

G.W.L: 3.5 m from G.L on 08.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 4
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.5 m from G.L on 08.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 4

Fig No. 04

Reduced Level	:	100.3
Start Date	:	06.03.2023
End Date	:	07.03.2023

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
Clayey **SAND** (SC)	Grey	Medium Dense, Granular	24.50	75.80		SPT-17	SS	23.00	23.00-23.45	10	13	15	28			
						SPT-18	SS	24.50	24.50-24.95	22	23	27	50			
Silty **SAND** (SM)	Grey	Very Dense, Granular	26.00	74.30		SPT-19	SS	26.00	26.00-26.45	24	23	38	61			
SAND (SP)	Brown	Very Dense, Granular	27.50	72.80		SPT-20	SS	27.50	27.50-27.84	23	45	>50	>100			50/04 cm Penetration
Weathered Rock						SPT-21	SS	28.50	28.50-28.61	>50	-	-	>100			50/11 cm Penetration
			29.50	70.80		SPT-22	SS	29.50	29.50-29.57	>50	-	-	>100			50/07 cm Penetration

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

G.W.L: 3.5 m from G.L on 08.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 5
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 2.9 m from G.L on 11.03.2023
UTM Co-ordinate	:
Termination Depth	: 32.0 m

Drilling Hole Record-BH 5

Fig No. 05

Reduced Level	:	100.3
Start Date	:	08.03.2023
End Date	:	10.03.2023

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
Gravelly Sandy **CLAY** (CI)	Brown	Very Siff, Layered	2.00	98.30		SPT-1	SS	1.00	1.00-1.45	4	5	15	20				
						SPT-2	SS	2.00	2.00-2.45	6	6	5	11				
SAND (SP)	Grey	Medium Dense, Granular	4.00	96.30		UDS-1	OT	2.50	2.50-2.95	-	-	-	-				G.W.L
						SPT-3	SS	3.00	3.00-3.45	7	4	7	11				
Sandy **CLAY** (CI)	Grey	Stiff, Layered	5.00	95.30		SPT-4	SS	4.00	4.00-4.45	4	6	6	12				
Silty **SAND** (SM)	Grey	Medium Dense, Granular	6.50	93.80		SPT-5	SS	5.00	5.00-5.45	4	5	7	12				
						SPT-6	SS	6.50	6.50-6.95	4	6	7	13				
SAND (SP)	Grey	Medium Dense, Granular	11.00	89.30		SPT-7	SS	8.00	8.00-8.45	5	6	8	14				
						SPT-8	SS	9.50	9.50-9.95	5	8	8	16				
Dark Greyish, Medium Stiff, Sandy **CLAY** (CI)						SPT-9	SS	11.00	11.00-11.45	2	2	3	5				

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

G.W.L: 2.9 m from G.L on 11.03.2023	No of SPT: 24 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 5
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 2.9 m from G.L on 11.03.2023
UTM Co-ordinate	:
Termination Depth	: 32.0 m

Drilling Hole Record-BH 5

Fig No. 05

Reduced Level	:	100.3
Start Date	:	08.03.2023
End Date	:	10.03.2023

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** (CI)	Dark Grey	Medium Stiff, Layered				SPT-10	SS	12.50	12.50-12.95	3	3	3	6				
Sandy **CLAY** (CH)			14.00	86.30		SPT-11	SS	14.00	14.00-14.45	3	5	6	11				
Clayey **SAND** (SC)	Dark Grey	Medium Dense, Granular	17.00	83.30		SPT-12	SS	15.50	15.50-15.95	9	11	10	21				
Sandy **CLAY** (CH)	Grey	Hard, Layered	18.50	81.80		SPT-13	SS	17.00	17.00-17.45	10	15	25	40				
CLAY (CH)	Grey	Very Stiff, Layered	21.50	78.80		SPT-14	SS	18.50	18.50-18.95	9	13	15	28				
SAND (SP)	Grey	Medium Dense, Granular	23.00	77.30		SPT-15	SS	20.00	20.00-20.45	10	11	12	23				
						SPT-16	SS	21.50	21.50-21.95	14	13	14	27				

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

G.W.L: 2.9 m from G.L on 11.03.2023	No of SPT: 24 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 5
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 2.9 m from G.L on 11.03.2023
UTM Co-ordinate	:
Termination Depth	: 32.0 m

Drilling Hole Record-BH 5

Fig No. 05

Reduced Level	:	100.3
Start Date	:	08.03.2023
End Date	:	10.03.2023

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
Silty **SAND** (SM)	Grey	Medium Dense, Granular				SPT-17	SS	23.00	23.00-23.45	16	12	10	22			
						SPT-18	SS	24.50	24.50-24.95	13	14	12	26			
			26.00	74.30		SPT-19	SS	26.00	26.00-26.45	11	16	20	36			
SAND (SP)	Grey	Dense, Granular	27.50	72.80		SPT-20	SS	27.50	27.50-27.77	35	>50	-	>100			50/12 cm Penetration
Sandy **CLAY** (CL)	Grey	Hard, Layered				SPT-21	SS	28.50	28.50-28.95	29	30	48	78			
			30.00	70.30		SPT-22	SS	30.00	30.00-30.10	>50	-	-	>100			50/10 cm Penetration
Weathered Rock						SPT-23	SS	31.00	31.00-31.08	>50	-	-	>100			50/08 cm Penetration
						SPT-24	SS	32.00	32.00-32.03	>50	-	-	>100			50/03 cm Penetration
			32.00	68.30												

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

G.W.L: 2.9 m from G.L on 11.03.2023	No of SPT: 24 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 6
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.1 m from G.L on 08.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 6

Fig No. 06

Reduced Level	:	100.3
Start Date	:	06.03.2023
End Date	:	07.03.2023

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 **SAND** (SM)	Brown	Dense, Granular			SPT-1	SS	1.00	1.00-1.45	10	15	24	39			
			2.00	98.30	SPT-2	SS	2.00	2.00-2.45	5	7	7	14			
Sandy **CLAY** (CL)	Grey	Stiff, Layered			SPT-3	SS	3.00	3.00-3.45	4	5	6	11			G.W.L
			4.00	96.30	UDS-1	OT	3.50	3.50-3.95	-	-	-	-			
SAND (SP)	Brown / Grey	Medium Dense, Granular			SPT-4	SS	4.00	4.00-4.45	10	8	10	18			
					SPT-5	SS	5.00	5.00-5.45	7	7	9	16			
					SPT-6	SS	6.50	6.50-6.95	8	5	7	12			
					SPT-7	SS	8.00	8.00-8.45	9	7	7	14			
			9.50	90.80	SPT-8	SS	9.50	9.50-9.95	10	10	12	22			
Silty **SAND** (SM)	Grey	Medium Dense, Granular													
			11.00	89.30	SPT-9	SS	11.00	11.00-11.45	5	7	6	13			
Greyish, Medium Dense, **SAND** (SP)															

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

G.W.L: 3.1 m from G.L on 08.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**Remarks**

Project : Soil Investigation for the Proposed Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 6
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.1 m from G.L on 08.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 6

Fig No. 06

Reduced Level	:	100.3
Start Date	:	06.03.2023
End Date	:	07.03.2023

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, Medium Dense, **SAND** (SP)			12.50	87.80												
						SPT-10	SS	12.50	12.50-12.95	6	6	9	15			
Silty **SAND** (SM)	Grey	Medium Dense, Granular	14.00	86.30												
						SPT-11	SS	14.00	14.00-14.45	4	3	4	7			
	Dark Grey	Loose, Granular	15.50	84.80												
						SPT-12	SS	15.50	15.50-15.95	5	5	6	11			
Clayey **SAND** (SC)						SPT-13	SS	17.00	17.00-17.45	8	9	7	16			
	Grey	Medium Dense, Granular	18.50	81.80												
						SPT-14	SS	18.50	18.50-18.95	8	12	14	26			
Sandy **CLAY** (CH)																
	Grey	Very Stiff, Layered				SPT-15	SS	20.00	20.00-20.45	10	11	10	21			
Sandy **CLAY** (CI)			21.50	78.80												
						SPT-16	SS	21.50	21.50-21.95	9	14	14	28			
Silty **SAND** (SM)	Grey	Medium Dense, Granular	23.00	77.30												

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

G.W.L: 3.1 m from G.L on 08.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 6
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 3.1 m from G.L on 08.03.2023
UTM Co-ordinate	:
Termination Depth	: 29.5 m

Drilling Hole Record-BH 6

Fig No. 06

Reduced Level	:	100.3
Start Date	:	06.03.2023
End Date	:	07.03.2023

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
SAND (SP)	Grey	Dense, Granular				SPT-17	SS	23.00	23.00-23.45	15	17	22	39			
	Brown					SPT-18	SS	24.50	24.50-24.95	19	20	23	43			
			26.00	74.30		SPT-19	SS	26.00	26.00-26.45	20	31	25	56			
	Grey	Very Dense, Granular	27.50	72.80		SPT-20	SS	27.50	27.50-27.71	35	>50	-	>100			50/06 cm Penetration
Weathered Rock						SPT-21	SS	28.50	28.50-28.55	>50	-	-	>100			50/05 cm Penetration
			29.50	70.80		SPT-22	SS	29.50	29.50-29.52	>50	-	-	>100			50/02 cm Penetration

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

G.W.L: 3.1 m from G.L on 08.03.2023	No of SPT: 22 Nos.	No of UDS : 1 No.	No of CR : Nil	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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 7
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 2.7 m from G.L on 07.03.2023
UTM Co-ordinate	:
Termination Depth	: 28.0 m

Drilling Hole Record-BH 7

Fig No. 07

Reduced Level	:	100.3
Start Date	:	05.03.2023
End Date	:	06.03.2023

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 **SAND** (SM)	Brown	Medium Dense, Granular	2.00	98.30		SPT-1	SS	1.00	1.00-1.45	13	10	9	19				
						SPT-2	SS	2.00	2.00-2.45	10	12	10	22				G.W.L
SAND (SP)	Brown	Medium Dense, Granular	6.50	93.80		SPT-3	SS	3.00	3.00-3.45	8	5	7	12				
						SPT-4	SS	4.00	4.00-4.45	6	6	5	11				
						UDS-1	OT	4.50	4.50-4.95	-	-	-	-				
						SPT-5	SS	5.00	5.00-5.45	4	5	7	12				
	Grey	Loose, Granular	8.00	92.30		SPT-6	SS	6.50	6.50-6.95	4	4	5	9				
		Medium Dense, Granular	11.00	89.30		SPT-7	SS	8.00	8.00-8.45	5	5	6	11				
						SPT-8	SS	9.50	9.50-9.95	7	6	9	15				
Dark Greyish, Medium Stiff, Sandy **CLAY** (CI)						SPT-9	SS	11.00	11.00-11.45	2	2	3	5				

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

G.W.L: 2.7 m from G.L on 07.03.2023	No of SPT: 21 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 7
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 2.7 m from G.L on 07.03.2023
UTM Co-ordinate	:
Termination Depth	: 28.0 m

Drilling Hole Record-BH 7

Fig No. 07

Reduced Level	:	100.3
Start Date	:	05.03.2023
End Date	:	06.03.2023

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
Dark Greyish, Medium Stiff, Sandy **CLAY** (Cl)			12.50	87.80		SPT-10	SS	12.50	12.50-12.95	3	4	4	8				
CLAY (CH)	Dark Grey	Medium Stiff, Layered	14.00	86.30		SPT-11	SS	14.00	14.00-14.45	2	3	4	7				
Clayey **SAND** (SC)	Dark Grey	Loose, Granular	18.50	81.80		SPT-12	SS	15.50	15.50-15.95	2	2	3	5				
						SPT-13	SS	17.00	17.00-17.45	2	3	3	6				
Sandy **CLAY** (CH)	Grey	Very Stiff, Layered	20.00	80.30		SPT-14	SS	18.50	18.50-18.95	9	11	12	23				
Gravelly Sandy **CLAY** (CH)	Grey	Hard, Layered	21.50	78.80		SPT-15	SS	20.00	20.00-20.45	11	23	13	36				
Sandy **CLAY** (CH)	Grey	Very Stiff, Layered	23.00	77.30		SPT-16	SS	21.50	21.50-21.95	7	19	10	29				

G.W.L: 2.7 m from G.L on 07.03.2023	No of SPT: 21 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

GEO FOUNDATIONS & STRUCTURES PVT. LTD

Bore Hole No	: BH 7
Location	: Padi Kuppam, Koyambedu
Type of Boring	: Calyx
Ground Water Level	: 2.7 m from G.L on 07.03.2023
UTM Co-ordinate	:
Termination Depth	: 28.0 m

Drilling Hole Record-BH 7

Fig No. 07

Reduced Level	:	100.3
Start Date	:	05.03.2023
End Date	:	06.03.2023

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
SAND (SP)	Grey	Medium Dense, Granular	24.50	75.80		SPT-17	SS	23.00	23.00-23.45	12	10	11	21				
		Very Dense, Granular	26.00	74.30		SPT-18	SS	24.50	24.50-24.95	12	35	36	71				
Weathered Rock			28.00	72.30		SPT-19	SS	26.00	26.00-26.36	19	48	>50	>100				50/06 cm Penetration
						SPT-20	SS	27.00	27.00-27.05	>50	-	-	>100				50/05 cm Penetration
						SPT-21	SS	28.00	28.00-28.04	>50	-	-	>100				50/04 cm Penetration

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

G.W.L: 2.7 m from G.L on 07.03.2023	No of SPT: 21 Nos.	No of UDS : 1 No.	No of CR : Nil	**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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

Boring Start : 10.03.2023 | **Table No. 1**

Boring End : 12.03.2023 | **Bore-Hole No. 1**

Location | **G.W.T: 3.6 m**

Padi Kuppam | **Termination Depth: 32 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
26	40	1.00	SPT-1	Silty **SAND**	SM	3	70	27							21					
19	25	2.00	SPT-2		SM	0	86	14							15					
-	-	2.50	UDS-1										1.62	1.91		2.67		DS		30
17	18	3.00	SPT-3		SM	0	71	29							21					
15	16	4.00	SPT-4	**SAND**	SP	1	91	8							18					
11	12	5.00	SPT-5		SP	0	93	7							6	2.67				
15	15	6.50	SPT-6		SP	0	96	4							3					
14	14	8.00	SPT-7		SP	0	94	6							6					
13	13	9.50	SPT-8		SP	0	93	7							17					
6	6	11.00	SPT-9	Sandy **CLAY**	CH	0	10	90	57	24	33									
11	11	12.50	SPT-10		CH	0	29	71	61	28	33									
15	15	14.00	SPT-11	Clayey **SAND**	SC	0	60	40	42	18	23				36					
14	14	15.50	SPT-12		SC	0	55	45	41	19	23									
27	27	17.00	SPT-13	Sandy Gravelly **CLAY**	CI	33	30	37	40	17	23				23		45			
33	33	18.50	SPT-14	Sandy **CLAY**	CH	0	14	86	96	30	66				44					
45	45	20.00	SPT-15		CH	0	11	89	94	35	59									
20	18	21.50	SPT-16	Silty **SAND**	SM	0	77	23												
35	25	23.00	SPT-17	**SAND**	SP	8	88	4							17					
33	24	24.50	SPT-18	Silty **SAND**	SM	0	89	11												
47	47	26.00	SPT-19	Sandy **CLAY**	CL	0	36	64	29	16	13				20					
58	58	27.50	SPT-20		CL	0	28	72	30	15	15				19					
>100	>100	29.00-29.26	SPT-21		CI	0	40	60	37	16	20				17					
>100	>100	30.50-30.73	SPT-22		CI	0	36	64	34	16	18				18					
>100	>100	32.00-32.06	SPT-23		CI	0	38	62	38	18	21				17					

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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

Boring Start : 10.03.2023 | **Table No. 2**

Boring End : 12.03.2023 | **Bore-Hole No. 2**

Location | **G.W.T: 3.8 m**

Padi Kuppam | **Termination Depth: 29.5 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
20	31	1.00	SPT-1	Gravelly Silty **SAND**	SM	14	69	17							13					
10	10	2.00	SPT-2	Sandy **CLAY**	CL	1	47	52	31	16	15				23		30			
-	-	2.50	UDS-1																	
11	11	3.00	SPT-3		CI	1	46	53	37	16	21				26		20			
11	12	4.00	SPT-4	Clayey **SAND**	SC	3	62	35	29	16	13				19					
20	18	5.00	SPT-5	**SAND**	SP	0	93	7							14					
18	17	6.50	SPT-6	Silty **SAND**	SM	0	88	12							11	2.66				
19	17	8.00	SPT-7	**SAND**	SP	0	92	8							8					
21	18	9.50	SPT-8		SP	2	92	6							9					
4	4	11.00	SPT-9	Sandy **CLAY**	CH	0	36	64	54	28	26									
5	5	12.50	SPT-10		CI	0	47	53	48	24	24				31					
5	5	14.00	SPT-11		CI	0	50	50	42	22	20									
3	3	15.50	SPT-12	Clayey **SAND**	SC	1	56	43	41	20	21				29		40			
3	3	17.00	SPT-13		SC	0	58	42							31					
21	21	18.50	SPT-14	Sandy Gravelly **CLAY**	CH	14	11	75	92	30	62				41					
25	25	20.00	SPT-15	Sandy **CLAY**	CH	0	14	86	96	26	70				39					
21	17	21.50	SPT-16	Silty **SAND**	SM	0	71	29							23					
33	25	23.00	SPT-17		SM	2	69	29							14					
21	16	24.50	SPT-18		SM	5	80	15												
43	43	26.00	SPT-19	Sandy **CLAY**	CI	0	20	80	44	21	23				16					
>100	>100	27.50-27.91	SPT-20	**Weathered Rock**																
>100	>100	28.50-28.88	SPT-21																	
>100	>100	29.50-29.56	SPT-22																	

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	Project : Soil Investigation for the Proposed Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.	Boring Start : 08.03.2023	Table No. 3
		Boring End : 10.03.2023	Bore-Hole No. 3
LABORATORY TEST RESULTS		Location	G.W.T: 3.6 m
		Padi Kuppam	Termination Depth: 29.5 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
23	35	1.00	SPT-1	Silty **SAND**	SM	3	79	18							21					
8	11	2.00	SPT-2	Silty Gravelly **SAND**	SP	28	44	28							28					
-	-	2.50	UDS-1										1.53	1.88				DS		28
12	14	3.00	SPT-3	Silty **SAND**	SM	2	87	11							19					
10	11	4.00	SPT-4		SM	0	56	44	Non Plastic						22					
13	14	5.00	SPT-5	Clayey **SAND**	SC	0	64	36							20					
18	17	6.50	SPT-6	Silty **SAND**	SM	2	85	13							20					
19	17	8.00	SPT-7		SM	0	89	11							21					
24	20	9.50	SPT-8	**SAND**	SP	0	94	6							19	2.68				
3	3	11.00	SPT-9	Clayey **SAND**	SC	0	65	35	43	22	21									
4	4	12.50	SPT-10	Gravelly Silty **SAND**	SM	24	50	26							37					
5	5	14.00	SPT-11	Sandy **CLAY**	CH	0	34	66	56	27	29				37					
6	6	15.50	SPT-12		CH	0	48	52	54	29	25						50			
7	7	17.00	SPT-13		CH	0	26	74	63	30	33				54					
24	24	18.50	SPT-14	**CLAY**	CH	0	6	94	110	28	82									
25	25	20.00	SPT-15	Sandy **CLAY**	CH	0	15	85	99	30	69				42					
22	19	21.50	SPT-16	Silty Gravelly **SAND**	SP	13	75	12							17					
25	20	23.00	SPT-17	Silty **SAND**	SM	3	72	25							19					
41	41	24.50	SPT-18	Sandy **CLAY**	CH	0	23	77	56	26	30				21					
46	46	26.00	SPT-19		CH	0	24	76	53	21	32						45			
>100	>100	27.50-27.62	SPT-20	**Weathered Rock**																
>100	>100	28.50-28.74	SPT-21																	
>100	>100	29.50-29.73	SPT-22																	

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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

Boring Start : 06.03.2023 | **Table No. 4**

Boring End : 07.03.2023 | **Bore-Hole No. 4**

Location | **G.W.T: 3.5 m**

Padi Kuppam | **Termination Depth: 29.5 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
19	29	1.00	SPT-1	Silty **SAND**	SM	2	74	24							9	2.63				
21	28	2.00	SPT-2		SP	0	94	6							7					
-	-	2.50	UDS-1										1.67	1.78		2.66		DS		31
16	19	3.00	SPT-3		SP	0	96	4							6					
16	17	4.00	SPT-4	**SAND**	SP	0	94	6							6					
15	16	5.00	SPT-5		SP	0	95	5							6					
12	13	6.50	SPT-6		SP	0	97	3							8					
14	14	8.00	SPT-7		SP	0	97	3							9					
16	16	9.50	SPT-8		SP	0	97	3							8					
4	4	11.00	SPT-9		SC	0	69	31	33	12	21				28					
5	5	12.50	SPT-10	Clayey **SAND**	SC	0	71	29	32	13	19				27					
3	3	14.00	SPT-11		SC	0	69	31												
6	6	15.50	SPT-12		CH	4	36	60	51	17	34				39		55			
11	11	17.00	SPT-13		CH	0	38	62	53	20	33						55			
23	23	18.50	SPT-14	Sandy **CLAY**	CH	0	34	66	56	26	30				40					
30	30	20.00	SPT-15		CH	0	22	78	112	32	80									
22	19	21.50	SPT-16	Silty **SAND**	SM	1	79	20							14					
28	22	23.00	SPT-17	Clayey **SAND**	SC	2	66	32	32	15	17				15					
50	33	24.50	SPT-18	Silty **SAND**	SM	0	84	16							12					
61	38	26.00	SPT-19	**SAND**	SP	0	96	4							4					
>100	>100	27.50-27.84	SPT-20																	
>100	>100	28.50-28.61	SPT-21	**Weathered Rock**																
>100	>100	29.50-29.57	SPT-22																	

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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

Boring Start : 08.03.2023 | **Table No. 5**

Boring End : 10.03.2023 | **Bore-Hole No. 5**

Location | **G.W.T: 2.9 m**

Padi Kuppam | **Termination Depth: 32 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
20	31	1.00	SPT-1	Gravelly Sandy **CLAY**	CI	10	39	51	37	20	17				23					
11	15	2.00	SPT-2	**SAND**	SP	1	91	8							14					
-	-	2.50	UDS-1										1.66	1.87		2.66		DS		30
11	13	3.00	SPT-3		SP	3	92	5							12					
12	12	4.00	SPT-4	Sandy **CLAY**	CI	0	46	64	35	18	17				22					
12	14	5.00	SPT-5	Silty **SAND**	SM	0	89	11							19	2.63				
13	14	6.50	SPT-6	**SAND**	SP	0	94	6							18					
14	15	8.00	SPT-7		SP	0	96	4							19					
16	16	9.50	SPT-8		SP	0	96	4							21					
5	5	11.00	SPT-9	Sandy **CLAY**	CI	0	37	63	48	25	23						45			
6	6	12.50	SPT-10		CH	0	15	85	68	35	33									
11	11	14.00	SPT-11	Clayey **SAND**	SC	0	73	27							24					
21	18	15.50	SPT-12		SC	0	62	38	39	19	20									
40	40	17.00	SPT-13	Sandy **CLAY**	CH	0	19	81	64	23	41				31					
28	28	18.50	SPT-14	**CLAY**	CH	0	6	94	72	31	41				39					
23	23	20.00	SPT-15		CH	0	5	95	93	30	63									
27	21	21.50	SPT-16	**SAND**	SP	1	84	15							22					
22	19	23.00	SPT-17	Silty **SAND**	SM	1	79	20							20					
26	21	24.50	SPT-18		SM	1	89	10							8					
36	26	26.00	SPT-19	**SAND**	SP	0	91	9							15					
>100	>100	27.50-27.77	SPT-20	Clayey **SAND**	SC	0	59	41	29	16	13									
78	78	28.50	SPT-21		SC	1	54	45	29	17	12									
>100	>100	30.00-30.10	SPT-22	**Weathered Rock**																
>100	>100	31.00-31.08	SPT-23																	
>100	>100	32.00-32.03	SPT-24																	

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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

Boring Start : 06.03.2023 | **Table No. 6**

Boring End : 07.03.2023 | **Bore-Hole No. 6**

Location | **G.W.T: 3.1 m**

Padi Kuppam | **Termination Depth: 29.5 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
39	60	1.00	SPT-1	Silty **SAND**	SM	0	86	14							12					
14	14	2.00	SPT-2	Sandy **CLAY**	CL	2	46	52	27	15	12				19		50			
11	11	3.00	SPT-3		CL	3	35	62	29	16	13				22		40			
-	-	3.50	UDS-1															UCS	0.7	
18	18	4.00	SPT-4	**SAND**	SP	2	91	7							19					
16	17	5.00	SPT-5		SP	0	92	8							18					
12	13	6.50	SPT-6		SP	0	94	6							20					
14	15	8.00	SPT-7		SP	0	94	6							18					
22	19	9.50	SPT-8	Silty **SAND**	SM	1	87	12							17					
13	13	11.00	SPT-9	**SAND**	SP	0	92	8							27					
15	15	12.50	SPT-10	Silty **SAND**	SM	0	84	16							30					
7	7	14.00	SPT-11	Clayey **SAND**	SC	0	62	38	35	18	17									
11	11	15.50	SPT-12		SC	0	67	33	33	17	16				28					
16	16	17.00	SPT-13		SC	0	74	26	30	14	16									
26	26	18.50	SPT-14	Sandy **CLAY**	CH	0	48	52	56	21	35				29		64			
21	21	20.00	SPT-15		CI	0	40	60	49	18	31									
28	22	21.50	SPT-16	Silty **SAND**	SM	0	82	18							21					
39	27	23.00	SPT-17	**SAND**	SP	0	91	9							15	2.65				
43	29	24.50	SPT-18		SP	0	97	3							12					
56	36	26.00	SPT-19		SP	0	93	7												
>100	>100	27.50-27.71	SPT-20	**Weathered Rock**																
>100	>100	28.50-28.55	SPT-21																	
>100	>100	29.50-29.52	SPT-22																	

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 Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.

Boring Start : 05.03.2023 | **Table No. 7**

Boring End : 06.03.2023 | **Bore-Hole No. 7**

Location | **G.W.T: 2.7 m**

Padi Kuppam | **Termination Depth: 28 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
19	29	1.00	SPT-1	Silty **SAND**	SM	5	78	17							14					
22	29	2.00	SPT-2		SP	0	96	4							16					
12	15	3.00	SPT-3		SP	0	95	5							15					
11	13	4.00	SPT-4		SP	0	96	4							17					
-	-	4.50	UDS-1															DS		30
12	14	5.00	SPT-5	**SAND**	SP	0	97	3							19					
9	10	6.50	SPT-6		SP	0	96	4							17					
11	12	8.00	SPT-7		SP	0	96	4							21					
15	15	9.50	SPT-8		SP	0	93	7							22	2.70				
5	5	11.00	SPT-9	Sandy **CLAY**	CI	2	44	54	45	19	26				36		45			
8	8	12.50	SPT-10	**CLAY**	CH	0	7	93	61	27	34				46		54			
7	7	14.00	SPT-11		SC	0	65	35	45	17	28				35					
5	5	15.50	SPT-12	Clayey **SAND**	SC	0	69	31	33	16	17				26					
6	6	17.00	SPT-13		SC	0	69	31	35	17	18				26					
23	23	18.50	SPT-14	Sandy **CLAY**	CH	0	18	82	83	29	54				39					
36	36	20.00	SPT-15	Gravelly Sandy **CLAY**	CH	11	15	74	80	33	47				45					
29	29	21.50	SPT-16	Sandy **CLAY**	CH	0	48	52	56	20	36				38					
21	18	23.00	SPT-17	**SAND**	SP	0	91	9												
71	43	24.50	SPT-18		SP	0	92	8												
>100	>100	26.00-26.36	SPT-19	**Weathered Rock**																
>100	>100	27.00-27.05	SPT-20																	
>100	>100	28.00-28.04	SPT-21																	

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

GEO FOUNDATIONS & STRUCTURES PVT.LTD.

CHEMICAL ANALYSIS OF GROUND WATER

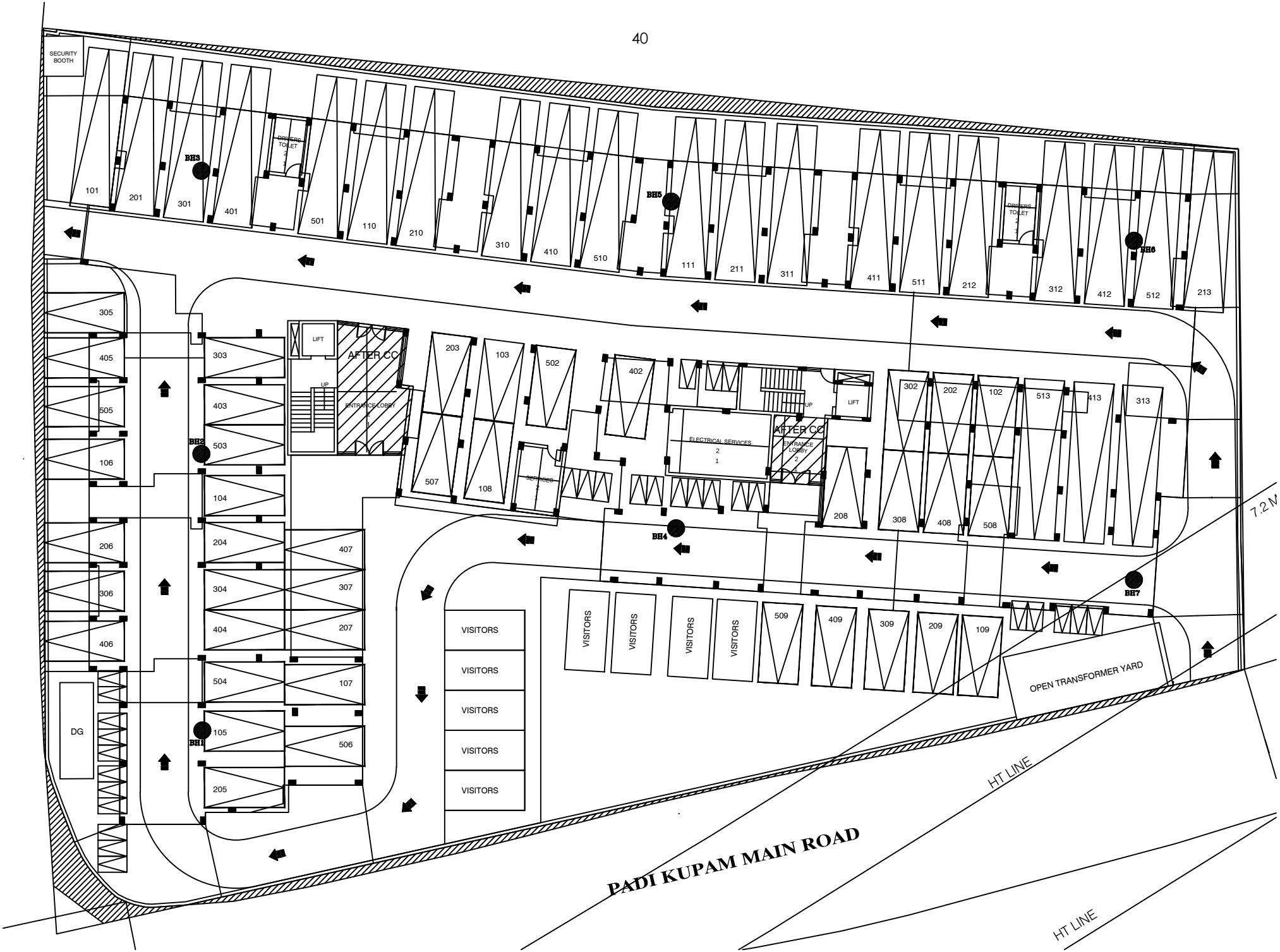
Project. No.	**: 1704**
Name of Project	**: Soil Investigation for the Proposed Structure (G+5 Floors) at Padi Kuppam, Koyambedu, Chennai.**
Ref. No.	**: SI/CHN/23/1704/01**

Table No. 8

Sl. No.	Tests	BH 1	BH 4	BH 6	Limits for using the ground water for mixing concrete
1	**Sulphate as SO_3 mg/l**	7	11	10	400 mg/l
2	**Chloride as Cl mg/l**	200	440	180	I.2000 mg/l for Plain concrete II. 500 mg/l for reinforced concrete
3	**pH @ 25° C**	7	7	7	6.0 Min

APPENDIX-IV

BOREHOLES LOCATION DRAWING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DRIVERS TOILET
LIFT
UP
AFTER CC
ENTRANCE LOBBY
ELECTRICAL SERVICES
SERVICES
VISITORS
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Kochi – 682 020
0484-2316042
ho@geo.net.in
gfsplk@gmail.com

Chennai

No.89,1st Main Road,
Gandhi Nagar,
Adyar
Chennai – 600 020
044 -24430399
mail@geo.net.in
gfsplc@gmail.com

Port Blair

Hotel Raja Deepam,
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