Verified RealEstate™

Your trusted partner for buying, selling, and managing property, ensuring hassle-free service with 100% transparency.

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
+91 9996 12 9996

Official Property Record

Digitally Verified Record - Powered by Verified RealEstate™



GEO MARINE
THE SPIRIT OF ENGINEERING

GEO MARINE CONSULTANTS (P) LTD.,

 # 11, 2nd Main Road, Kannappa Nagar Ext,
Kottivakkam, Chennai – 600 041.
Ph. No. 044 - 24481485 & 24480305.
geotech@geomarineindia.com / drcvp@geomarineindia.com

NAME OF PROJECT

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING CONSISTING OF STILT+ 5 UPPER FLOORS AT MUTTUKADU, CHENNAI.

CLIENT

M/s CHAITANYA FOUNDATIONS PVT LTD.,
BANYAN VIEW – 3rd FLOOR,
NO-39, KARPAGAM GARDENS,
Ist MAIN ROAD, ADYAR,
CHENNAI 600 020

TITLE

GEOTECHNICAL INVESTIGATION REPORT

REPORT NO.: GT- 2569

DATE	REVISON	DESCRIPTION		AUTHORISED SIGNATORY
13/05/2023	FIRST SUBMISSION	SUBMISSION OF GEOTECHNICAL REPORT	SIGN	Dr.C.VENKATA PRASAD Registered Geotechnical Engineer (RGTE) Registration No: CGLDIST/RGTE/2020/12/00 District Town and Country Planning Office, Chengalpattu-603 001. Mob No: +919444026189 Email-drcvp@geomarineindia.com
			DATE	13/05/2020
			DESIGNATION	MANAGING DIRECTOR
			NAME	DR. C.V.PRASAD

□O□TE□TS

GEOMARINE
THE SPIRIT OF ENGINEERING

CONTENTS

	SECTION NO.		PAGE NO.
		CONTENTS	i-ii
CHAPTER		INTRODUCTION	
	1.0	Project Information Matrix	1
	1.1	Scope of Work	1
	1.1.1	Field Work	1
	1.1.2	Laboratory Work	1
	1.2	Structure of the Report	1
CHAPTER		INVESTIGATION METHODOLOGY & TEST RESULTS	
	2.0	Preamble	2
	2.1	Methodology of Field Work	2
	2.1.1	Equipment Used and Method of Drilling	2
	2.1.2	Standard Penetration Test	2
	2.1.3	Collection of Soil Samples	2
	2.1.4	Collection of Ground Water Samples	2-3
	2.2	Laboratory Testing	3
	2.2.1	On Coarse Grained Soil	3
	2.2.2	On Fine Grained Soil	3
	2.2.3	Chemical Analysis Tests	3
	2.3	Summary	3
FIGURES	2.0	Site Plan showing the Location of Field Investigation Points	4
	2.1 to 2.3	Soil Profile	5-10
	2.4	Cross section Profile	11
	2.5 to 2.7	Graphical Representation of Grain Size Distribution Curve	12-14
	2.8 & 2.9	Hydrometer analysis curve	15-16
TABLES	2.1 & 2.3	Laboratory test Results	17-19
	2.4 & 2.5	Results of Chemical analysis	20-21
CHAPTER		GEOLOGY & SUBSURFACE STRATIFICATION	
	3.0	Preamble	22
	3.1	Climate & Rainfall	22
	3.2	Geomorphology	22
	3.3 & 3.4	Geology of the Region	22-23
	3.5	Design Sub Soil Profile	23-24

□□A□TER□□ **□OU□□AT□O□ SYSTEM**

4.0	Preamble	25
4.1	Proposed Structures	25
4.2	Sub soil profile	25
4.3	Foundation System	25

□□A□TER□□ **RE□OMME□□AT□O□S** 26

A□□E□URE□□ Typical bearing capacity computations for shallow foundations

A1	Relationship between Angle of Internal Friction & N-Value
A2	Relationship between UCC & SPT -Value (N) of Saturated Clay

A□□E□URE□□□ **MA□US□R□□T O□ □EL□ BORE □□ART**
□EL□ S□T □□OTOS
□EL□ □□□EST□□AT□O□ □□OTOS

REPORT TEXT

CHAPTER 1

INTRODUCTION

1.1 PROJECT INFORMATION MATRIX

Nature of project : PROPOSED RESIDENTIAL BUILDING

Structure : STILT + UPPER FLOORS

Project Owner : M/s. ANANTHAVEL CONSTRUCTIONS PVT LTD

Project Location : MUTTUKADU, CHENNAI

Job Code : GT2024/1

1.2 SCOPE OF WORK

FIELD WORK

- Conducting three soil investigation bore holes of 150 mm diameter in Soil & Overburden. In case of rock formation NX Diameter with Core barrel shall be adopted to progress the drilling up the termination depth.
- Conducting Standard Penetration Test (SPT) within the borehole at:
  - Every 1.0m depth interval up to 6.0m.
  - From 6.0m to 12.0m, SPT is conducted at every 1.5m depth interval
  - From 12.0m to 20.0m SPT is conducted at every 2.0m depth interval
- Collection of disturbed soil samples at SPT location and undisturbed samples from the clayey strata with SPT-value greater than 2 to less than 15 if met within the investigation depth
- Collection of water samples if groundwater table met within the investigation depth

LABORATORY WORK

- Natural Moisture Content
- Atterberg's limits
- Grain Size Analysis
- Consolidation test on undisturbed samples if applicable
- Chemical Analysis test on soil and water samples to give pH, Chlorides and Sulphates

1.3 STRUCTURE OF THE REPORT

- Contents
- Introduction
- Investigation Methodology & Test Results
- Sub-Surface Stratification
- Foundation System
- Recommendation
- Annexure

2.0 INVESTIGATION METHODOLOGY
TEST RESULTS

2.0.1 PREAMBLE

Three soil investigation boreholes were put as per the planning of the engineer in-charge and these locations are shown in Fig.2.0.The equipment used and the methodology adopted to carry out the fieldwork is described below.

2.0.2 METHODOLOGY OF FIELD WORK

2.0.2.1 EQUIPMENT USED AND METHOD OF DRILLING

All the boreholes were sunk by conventional rotary drilling rigs. For borehole Methodology followed for boring conformed to IS: 1892 -2000. Boring was progressed by the cutting action of rotating bit with water circulation and stabilizing the side of the boreholes by using casing pipes/bentonite slurry up to required depth to prevent collapse of sidewall. Boring was continued by normal boring process using MS soil cutter in soil. However Tungsten Carbide (TC) bit drilling was resorted to drill in highly weathered rock stratum where the normal boring process became slow. Diamond Core (DC) bit drilling was adopted in moderately weathered rock formations where penetration using TC bit was became slow.

2.0.2.2 STANDARD PENETRATION TESTS

This is a field test to determine “Penetration Resistance of Stratum at the Test Depth”. This has been conducted in the boreholes generally up to refusal depth using procedures described in IS: 2131- 2002. In this test, split spoon sampler (50.8 mm OD and 35 mm ID) has replaced driving bit. Sampler is then driven by dropping 63.5 kg hammer on top of driving collar with free fall of 75 cm. The length of sampler is 60 cm.

The tests were conducted at the depth intervals indicated in Chapter-1 (Sec.1.1.1).

2.0.2.3 COLLECTION OF SOIL SAMPLES

2.0.2.3.1 DISTURBED SAMPLES

The SPT-samples collected were used as disturbed soil samples. These samples were used for visual and physical identification and for conducting laboratory classification tests as per I.S.1498-1970.

2.0.2.3.2 UNDISTURBED SAMPLES

From the soft to stiff clay layer, representative undisturbed samples were collected. These samples were used primarily to establish the compressibility parameters to estimate the settlements of shallow foundation system wherever applicable.

2.0.2.4 COLLECTION OF GROUND WATER SAMPLES

One representative water sample from each borehole was collected after 24 hours of completing the borehole if water table met within the investigated depth.

NOTE ON GROUNDWATER TABLE REPORT

- ❖ Groundwater table observation in geotechnical report is predominantly to arrive at foundation design criteria and shall not be construed as design guidelines for the design of dewatering systems
- ❖ The groundwater level indicated in the bore logs is specific to the duration of investigation and intensity of the monsoon rains during the time of investigation. Hence, the level shall be taken as guidelines only to plan the investigation for the dewatering system
- ❖ No foundation excavation or basement excavations if anticipated within the groundwater table zone shall be carried out without implementing groundwater lowering schemes

LABORATORY TEST

ON COARSE GRAINED SOIL

On the representative samples, sieve analysis tests were conducted to arrive at grain size distribution. These tests were conducted as per I.S.2720 (part 4)-1985 and the results are presented in Tables-2.1 to 2.3. The graphical representation of grainsize distribution curve for the representative samples in each bore is presented in Fig. 2.5 to 2.7.

ON FINE GRAINED SOIL

On the SPT sample index property tests were conducted to estimate consistency. These test results are presented in Tables-2.1 to 2.3. The graphical representation of hydrometer analyses curve for the representative samples in each bore is presented in Fig. 2.8 & 2.9.

CHEMICAL ANALYSIS TESTS

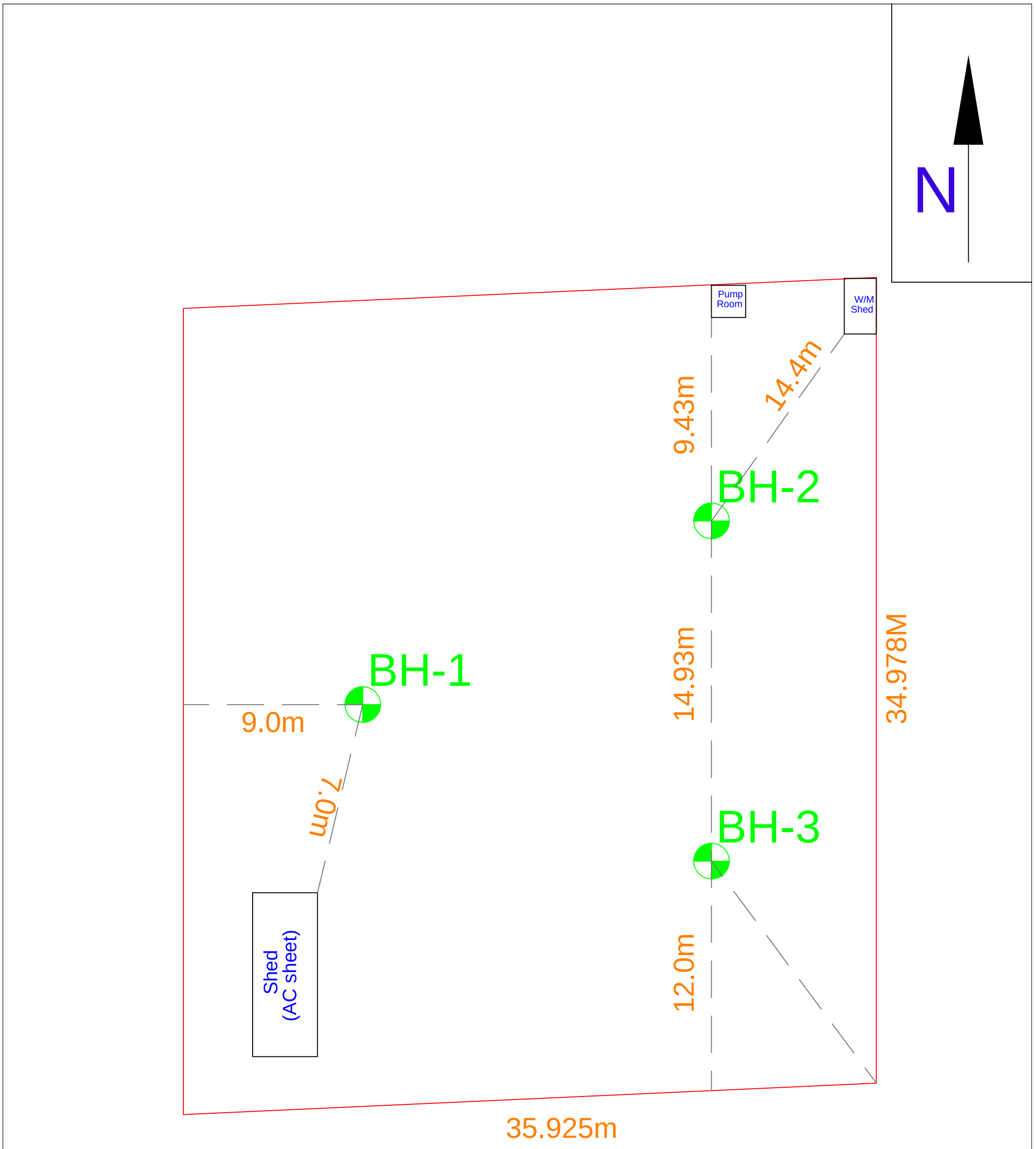
On representative soil and water samples chemical analysis tests were conducted to estimate pH, Chloride and Sulphates and these results are presented in Table - 2.4 & 2.5.

SUMMARY

The locations of the field investigation boreholes are shown in site plan given in Fig.2.0. The average sub soil profiles encountered at each location along with their classification and engineering properties are presented in Figs.2.1 to 2.3.

The cross sectional variation of sub soil formation is presented in Fig. 2.4

SITE PLAN



□□□ □□□ S□TE □LA□ S□O□ □□ □ T□E □□EL□

□□ □EST□□AT□O□ BORE□OLE LO□AT□O□

SOIL PROFILES

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-01
SHEET	O
DIA OF BORE HOLE	150mm ✓ / NX
BORE START DATE	
BORE END DATE	
TOTAL DRILL DAYS	

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING				
LOCATION		MACHINE No.		CHAINAGE (m)	
STRUCTURE		DRILLING METHOD	Rotary	CO-ORDINATES N	
JOB CODE		FLUSHING MEDIUM	Bentonite	CO-ORDINATES E	

Depth below E.G.L. (m)	Date	Time Hr.	Time Min.	Type of Drill Bit (SC / TCB / DB)	Total Core Recovery %	R.Q.D %	Blows/cm. 0-15	Blows/cm. 15-30	Blows/cm. 30-45	S.T	Depth	No.	Type	RL (m)	Legend	No	Depth	Geotechnical Description
		09	08															
			T	SC	-	-												
		09	09				12	18	17		0.50	1	SS	-0.5				
		09	19								0.95							
			T	SC	-	-												
		09	20				10	15	21		1.25	2	SS	-1.3				
		09	30								1.70							
			T	SC	-	-												
		09	31				9	21	25		2.00	3	SS	-2.0				
		09	42								2.45							
			T	SC	-	-												
		09	43															Brown,Moist,Poorly Graded,Fine & Medium Grains Sands,Dense,
		09	51				12	28	30		3.00	4	SS	-3.0				
			T	SC	-	-					3.45							
		09	52															
		10	02				25	27	17		4.00	5	SS	-4.0				
			T	SC	-	-					4.45							
		10	03															
		10	16				10	12	24		5.00	6	SS	-5.0				
			T	SC	-	-					5.45							
		10	17															
		10	32				22	55	61		6.00	7	SS	-6.0		L1	6.0	
			T	SC	-	-					6.45							
		10	33															
		10	50				37	4Cm Penet for 50 Blows			7.50	8	SS	-7.5				
			T	SC	-	-					7.69							Brown,Grey Brown,Moist,Poorly Graded,Fine & Medium Grains Sands, Very Dense,
		10	51															
		11	09				21	36	38		9.00	9	SS	-9.0				
			T	SC	-	-					9.45							
		11	10															

CS - Core Sample	DS - Disturbed Sample	LO E	B r	RO E T S TE ETA LS	REMAR S
SS - Split Spoon Sample	SC - Soil Cutter	ATE		ROU LE EL	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	E E	S r	ATER TABLE	
WS - Wash Sample	DB - Diamond Bit	ATE		AS E T	

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-01
SHEET	□ O□ □

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING					DIA OF BORE HOLE	150mm ✓ / NX
LOCATION	M□□□□□d□□□ □□□□□□	MACHINE No.	□R□□□	CHAINAGE (m)	□	BORE START DATE	□□□□□□□□□□
STRUCTURE	S□□□□ □ □□□□r□	DRILLING METHOD	Rotary	CO-ORDINATES	N □	BORE END DATE	□□□□□□□□□□
JOB CODE	□T□□□□□	FLUSHING MEDIUM	Bentonite		E □	TOTAL DRILL DAYS	□

Depth below E.G.L. (m)	Date	Time Hr.	Time Min.	Type of Drill Bit (SC / TCB / DB)	Total Core Recovery %	R.Q.D %	Blows/cm. 0-15	Blows/cm. 15-30	Blows/cm. 30-45	S□T □□ □□□□	Depth	No.	Type	RL (m)	Legend	No	Depth	Geotechnical Description
																		Brown,Grey Brown,Moist,Very Dense,□□□r□□ □r□d□d SA□□ □S□□□□ SA□□ □S□□SM□
□□		11	37	SC	-	-	9	17	21	□□	10.50	10	SS	-10.5		L2	10.5	
		T□									10.95							
		11	39															
□□							8	12	10	□□	12.00	11	SS	-12.0				Grey,Green Grey,Moist,Poorly Graded, Fine & Medium Grains Sands,Medium Dense & Dense,S□□□□ SA□□ □SM□□ □□□ B□d□r □ S□□□□ SA□□ □SM□
											12.45							
□□		15	15	SC	-	-												
		T□																
		15	45															
□□							16	26	39	□□	13.50	12	SS	-13.5		L3	13.5	
											13.95							
		15	15															Green Grey,Ofwhite @ Parts,Moist, Poorly Graded,Fine to Coarse Sand With Grravels Traces,Very Dense,□□r□□□ S□□□□ SA□□ □SM□□ □□□ B□□d□r □ R□□□d□□□S□□□ T□□□□r□ O□□□r□□r□d □□□r□□□ □□□□□□□□□r□□□d R□□□ □□r□ □□□□□□□
□□		T□		SC	-	-	9Cm Penet for 50 Blows			□□□□	15.00	13	SS	-15.0				
		15	45								15.09							
□□							40	51	9Cm Penet for 50 Blows	□□□□	16.50	14	SS	-16.5		L4	16.5	
											16.89					L5	16.9	Grey Brown,Very Dense,□□□ □□□□□□□□ □ □□□□□□r□d R□□□ □□r□d□ □ □R□□□ □□r□ □□□□□□
□□																		
□□																		
□□																		
□□																		

CS - Core Sample	DS - Disturbed Sample	LO□□E□	□B□□□□r	□RO□E□T S□TE □ETA□LS	REMAR□S
SS - Split Spoon Sample	SC - Soil Cutter	□ATE	□□□□□□□□□□	□ROU□□ LE□EL □□ □	□□□□
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	□□E□□E□	□S□□r□ □□□	□ ATER TABLE □□ □	□□□□
WS - Wash Sample	DB - Diamond Bit	□ATE	□□□□□□□□□□	□AS□□ □E□T□ □□ □	□□□□

B□r□□□□□ □□r□ □□□□□d □□□□□□ □ d□□□□ □□□□□ E□□ □L
□□□ □□□□ S□□ S□□□□r□□□□ □□B□ □□□ L□□□□□□□□

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-02
SHEET	1 OF 1
PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING
DIA OF BORE HOLE	150mm ✓ / NX
LOCATION	Mulund
MACHINE No.	1
CHAINAGE (m)	
BORE START DATE	
STRUCTURE	Station
DRILLING METHOD	Rotary
CO-ORDINATES N	
BORE END DATE	
JOB CODE	
FLUSHING MEDIUM	Bentonite
CO-ORDINATES E	
TOTAL DRILL DAYS	

Depth below E.G.L. (m)	Date	Time Hr.	Time Min.	Type of Drill Bit (SC / TCB / DB)	Total Core Recovery %	R.Q.D %	Blows/cm. 0-15	Blows/cm. 15-30	Blows/cm. 30-45	S.T	Depth	No.	Type	RL (m)	Legend	No	Depth	Geotechnical Description
0		08	57	SC	-	-												
			T1				9	16	21	37	0.50	1	SS	-0.5				
		08	58								0.95							
		09	11	SC	-	-												Brown,Moist,Poorly Graded,Fine & Medium Grains Sands,Dense,
			T2				10	19	22	41	1.25	2	SS	-1.3				
		09	12								1.70							
		09	22	SC	-	-												
			T3				12	26	28	54	2.00	3	SS	-2.0		L1	2.0	
		09	23								2.45							
		09	32	SC	-	-												
			T4				16	32	28	60	3.00	4	SS	-3.0				
		09	33								3.45							Brown,Moist,Poorly Graded,Fine & Medium Grains Sands,Dense,
		09	45	SC	-	-												
			T5				35	38	31	69	4.00	5	SS	-4.0				
		09	46								4.45							
		09	58	SC	-	-												
			T6				21	47	55	102	5.00	6	SS	-5.0		L2	5.0	
		09	59								5.45							
		10	10	SC	-	-												
			T7				28	8Cm Penet for 50 Blows		50	6.00	7	SS	-6.0				
		10	11								6.23							
		10	25	SC	-	-												
			T8				50	5Cm Penet for 50 Blows		50	7.50	8	SS	-7.5				Brown,Grey,Moist,Poorly Graded, Fine & Medium Grains Sands,Very Dense,
		10	26								7.70							
		10	41	SC	-	-												
			T9				26	61	6Cm Penet for 40 Blows	87	9.00	9	SS	-9.0				
		10	42								9.36							
		11	02	SC	-	-												
			T10															
		11	03															

CS - Core Sample	DS - Disturbed Sample	LOGGED	BORER	ROUTE STATE DETAILS	REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE		ROUGH LEVEL	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	SHEET	WATER TABLE	
WS - Wash Sample	DB - Diamond Bit	DATE		CASING DEPTH	

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-02
SHEET	□ O□ □

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING	DIA OF BORE HOLE	150mm ✓ / NX

LOCATION	M□□□□d□□□ □□□□□□	MACHINE No.	□R□□□	CHAINAGE (m)	□	BORE START DATE	□□□□□□□□□□
STRUCTURE	S□□□□ □ □□□r□	DRILLING METHOD	Rotary	CO-ORDINATES	N □	BORE END DATE	□□□□□□□□□□
JOB CODE	□T□□□□□	FLUSHING MEDIUM	Bentonite		E □	TOTAL DRILL DAYS	□

Depth below E.G.L. (m)	Date	Time Hr.	Time Min.	Type of Drill Bit (SC / TCB / DB)	Total Core Recovery %	R.Q.D %	Blows/cm. 0-15	Blows/cm. 15-30	Blows/cm. 30-45	S□T □□□□	Depth	No.	Type	RL (m)	Legend	No	Depth	Geotechnical Description
																L3	10.5	□□□r□□ □r□d□d SA□□ □S□□□ SA□□ □S□□ SM□□ □ T□□ □□ □ S□□□ SA□□ □SM□
□□		11	23	SC	-	-	12	15	23	□□	10.50 / 10.95	10	SS	-10.5				
		T□																
		11	24															
□□							10	10	10	□□	12.00 / 12.45	11	SS	-12.0				Grey,Green Grey,Moist,Poorly Graded, Fine & Medium Grains Sands,Medium Dense & Dense,□□□□□□ S□□□□ SA□□ □S□□ □ S□□□□ SA□□ □SM□□ □□□ B□□d□r
□□		11	43	SC	-	-										L4	13.5	
		T□																
		11	44															
□□							11	31	25	□□	14.00 / 14.45	12	SS	-14.0				Green Grey,Ofwhite @ Parts,Moist, Poorly Graded,Fine to Coarse Sand With Grravels Traces,Very Dense,□□r□□□ S□□□□ SA□□ □SM□□ □□□ B□□d□r □ R□□□d□□□S□□ T□□□□r□ O□□□r□□r□d (Partly Disintegrated Rock Formation) @ 16.0m, Very Dense,□□□ □□□□□□□ □ □□□□□r□d R□□□ □□r□d□ □ □R□□□ □□r□ □□□□□
		12	14	SC	-	-												
□□		T□																
		12	18															
							7Cm Penet for 50 Blows			□□□□	16.00 / 16.07	13	SS	-16.0		L5	16.1	
□□																		
□□																		
□□																		
□□																		
□□																		

CS - Core Sample	DS - Disturbed Sample	LO□□E□	□B□□□□r	□RO□E□T S□TE □ETA□LS	REMAR□S
SS - Split Spoon Sample	SC - Soil Cutter	□ATE	□□□□□□□□□□	□ROU□□ LE□EL □□ □ □□□□	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	□□E□□E□	□S□□r□ □□□	□ ATER TABLE □□ □ □□□□	
WS - Wash Sample	DB - Diamond Bit	□ATE	□□□□□□□□□□	□AS□□ □E□T□ □□ □ □□□□	

B□r□□□□□ □□r□ □□□□□d □□□□ □ d□□□□ □□□□□ E□□ □L

□□□ □□□□ S□□ S□□□□r□□□□ □□B□ □□□ L□□□□□□□

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-03
SHEET	□ O□ □

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING	DIA OF BORE HOLE	150mm ✓ / NX

LOCATION	M□□□□d□□□ □□□□□□	MACHINE No.	□R□□□	CHAINAGE (m)	□	BORE START DATE	□□□□□□□□□□
STRUCTURE	S□□□□ □ □□□□r□	DRILLING METHOD	Rotary	CO-ORDINATES	N □	BORE END DATE	□□□□□□□□□□
JOB CODE	□T□□□□□	FLUSHING MEDIUM	Bentonite		E □	TOTAL DRILL DAYS	□

Depth below E.G.L. (m)	Date	Time Hr.	Time Min.	Type of Drill Bit (SC / TCB / DB)	Total Core Recovery %	R.Q.D %	Blows/cm. 0-15	Blows/cm. 15-30	Blows/cm. 30-45	S□T □□ □□□□	Depth	No.	Type	RL (m)	Legend	No	Depth	Geotechnical Description
□	□□□□□□□□	09	01	SC	-	-												
		T□																
		09	02				10	13	14	□□	0.50	1	SS	-0.5				
		09	10								0.95							Brown,Moist,Poorly Graded,Fine & Medium Grains Sands,Medium Dense & Dense,□□□r□ □r□d□d SA□□ □S□□□ SA□□ □S□□SM□□ □□□r□ □r□d□d SA□□ □S□□
□		T□		SC	-	-												
		09	11				7	13	18	□□	1.25	2	SS	-1.3				
		09	24								1.70							
		T□		SC	-	-												
□		09	25				13	22	29	□□	2.00	3	SS	-2.0		L1	2.0	
		09	33								2.45							Brown,Moist,Poorly Graded,Fine & Medium Grains Sands,Very Dense, □□□r□ □r□d□d SA□□ □S□□□ SA□□ □S□□SM
		T□		SC	-	-												
		09	34															
□							17	37	45	□□	3.00	4	SS	-3.0		L2	3.0	
		09	45								3.45							
		T□		SC	-	-												
		09	46															
□							29	46	51	□□	4.00	5	SS	-4.0				
		09	59								4.45							
		T□		SC	-	-												
		10	00															
□							22	41	50	□□	5.00	6	SS	-5.0				
		10	16								5.45							
		T□		SC	-	-												
		10	17															
□							26	63	5Cm Penet for 40 Blows	□□□□	6.00	7	SS	-6.0				
		10	29								6.35							Brown,Grey Brown,Moist,Poorly Graded,Fine & Medium Grains Sands, Very Dense□□□r□ □r□d□d SA□□ □S□□□ SA□□ □S□□SM□
		T□		SC	-	-												
		10	30															
□							57	7Cm Penet for 50 Blows		□□□□	7.50	8	SS	-7.5				
											7.77							
		10	46															
		T□		SC	-	-												
		10	47															
□							24	48	59	□□□	9.00	9	SS	-9.0				
		11	05								9.45							
		T□		SC	-	-												
□□		11	06															

CS - Core Sample	DS - Disturbed Sample	LO□□E□	□B□□□r	□RO□E□T S□TE □ETA□LS	REMAR□S
SS - Split Spoon Sample	SC - Soil Cutter	□ATE	□□□□□□□□□□	□ROU□□ LE□EL □□ □	□□□□
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	□□E□□E□	□□S□□r□ □□□	□ ATER TABLE □□ □	□□□□
WS - Wash Sample	DB - Diamond Bit	□ATE	□□□□□□□□□□	□AS□□ □E□T□ □□ □	□□□□

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-03
SHEET	□ O□ □

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING	DIA OF BORE HOLE	150mm ✓ / NX ✓

LOCATION	M□□□□d□□□ □□□□□□	MACHINE No.	□R□□□	CHAINAGE (m)	□	BORE START DATE	□□□□□□□□□□
STRUCTURE	S□□□□ □ □□□r□	DRILLING METHOD	Rotary	CO-ORDINATES N	□	BORE END DATE	□□□□□□□□□□
JOB CODE	□T□□□□□	FLUSHING MEDIUM	Bentonite	CO-ORDINATES E	□	TOTAL DRILL DAYS	□

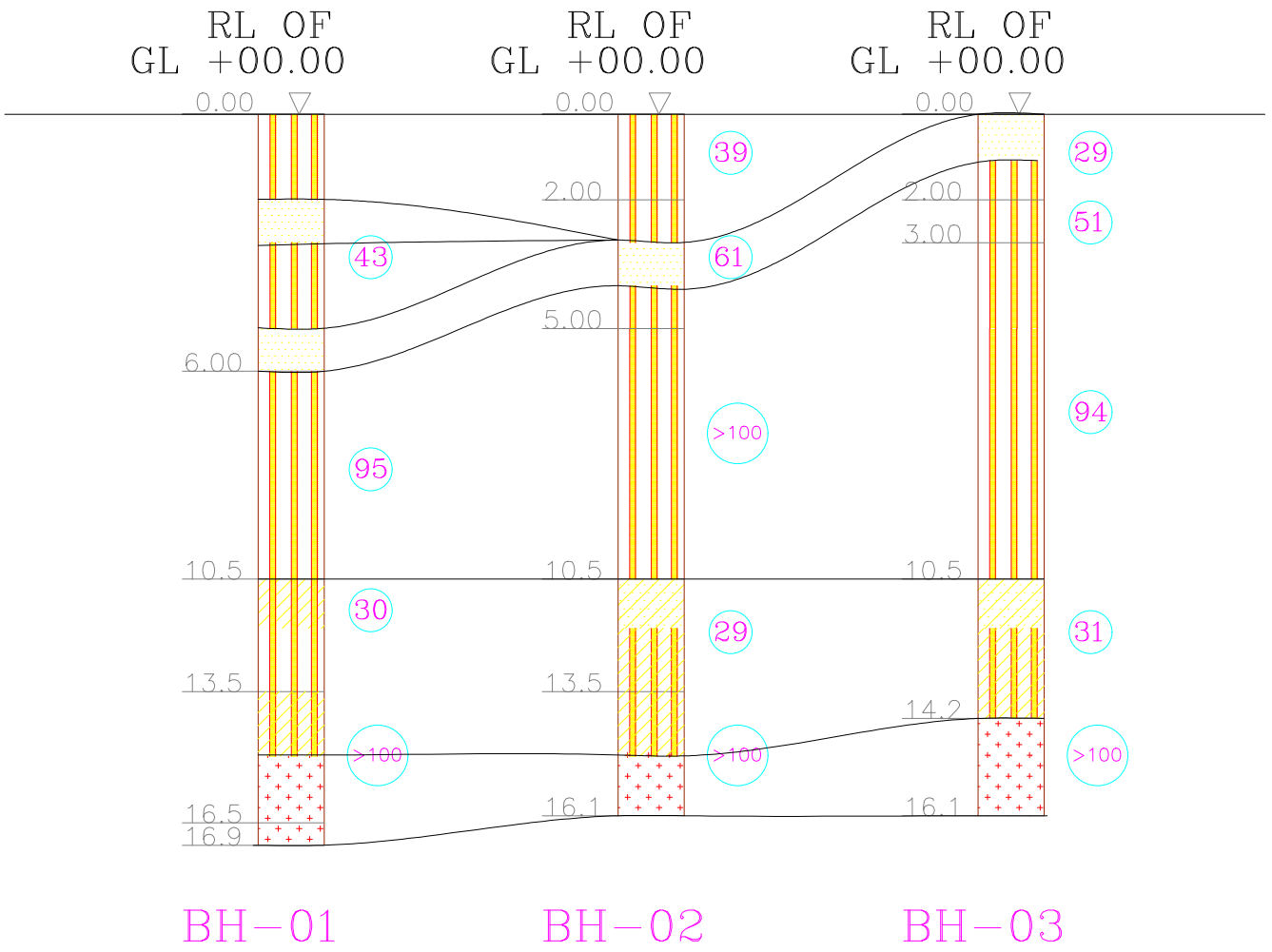
Depth below E.G.L. (m)	Date	Time Hr.	Time Min.	Type of Drill Bit (SC / TCB / DB)	Total Core Recovery %	R.Q.D %	Blows/cm. 0-15	Blows/cm. 15-30	Blows/cm. 30-45	S□T □□□ □□□□	Depth	No.	Type	RL (m)	Legend	No	Depth	Geotechnical Description
□□							8	11	13	□□	10.50 / 10.95	10	SS	-10.5		L3	10.5	Very Dense, □□□r□□ □r□d□d SA□□ □S□□□ SA□□ □S□SM□
□□		11	23	SC	-	-	12	17	21	□□	12.00 / 12.45	11	SS	-12.0				Grey,Green Grey,Moist,Poorly Graded, Fine & Medium Grains Sands,Medium Dense & Dense, □□□□□□S□□□□SA□□ □S□□ □ S□□□□SA□□ □SM□□ □□□ B□d□r
		T□																
		11	24															
□□	□□□□□□□□□□	11	42															
		T□		SC	-	-												
		11	4543															
□□							37	5Cm Penet for 50 Blows		□□□□	14.00 / 14.20	12	SS	-14.0		L4	14.2	
□□		12	10	SC	-	-									+ + + / + + / + + + / + + / + + + / + +			Green Grey,Offwhite Grey,Moist,Fine to Coarse Grain Sand Size Particles With traces of Gravels,Very Dene,R□□d□□□ S□□□□□ □ □□ □□□□□□□ □ □□□□□r□d R□□□ □ □r□d□ □ □R□□□ □□r□ □□□□□ Disintegrated Granitic Rock
		T□																
		12	29															
□□							3Cm Penet for 15 Blows			□□□□	16.00 / 16.03	-	WS	-16.0	+ + + / + +	L5	16.1	
□□																		
□□																		
□□																		
□□																		
□□																		

CS - Core Sample	DS - Disturbed Sample	LO□□E□	□B□□□□r	□RO□E□T S□TE □ETA□LS	REMAR□S
SS - Split Spoon Sample	SC - Soil Cutter	□ATE	□□□□□□□□□□	□ROU□□ LE□EL □□ □ □□□□	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	□□E□□E□	□S□□r□ □□□	□ ATER TABLE □□ □ □□□□	
WS - Wash Sample	DB - Diamond Bit	□ATE	□□□□□□□□□□	□AS□□ □E□T□ □□ □ □□□□	

B□r□□□□□ □□r□ □□□□d □□□□ □ d□□□□ □□□□ E□□ □L

□□□ □□□□ S□□ S□□□□r□□□□ □□B□ □□□ L□□□□□□□

CROSS SECTION PROFILE



LEGEND

CLAYEY SILTY SAND (SC)

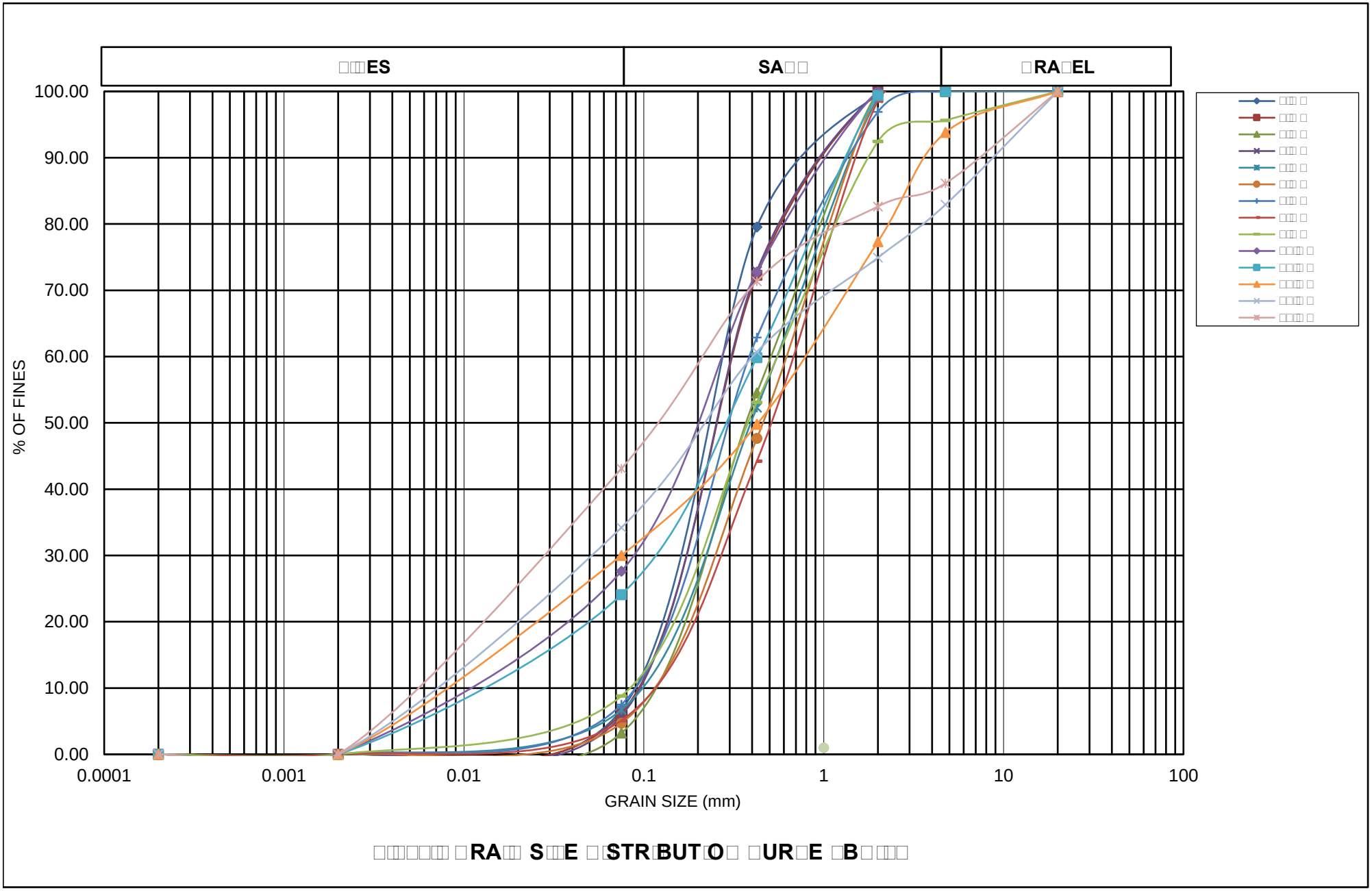
SILTY SAND (SM)

Poorly Graded SAND (SP)

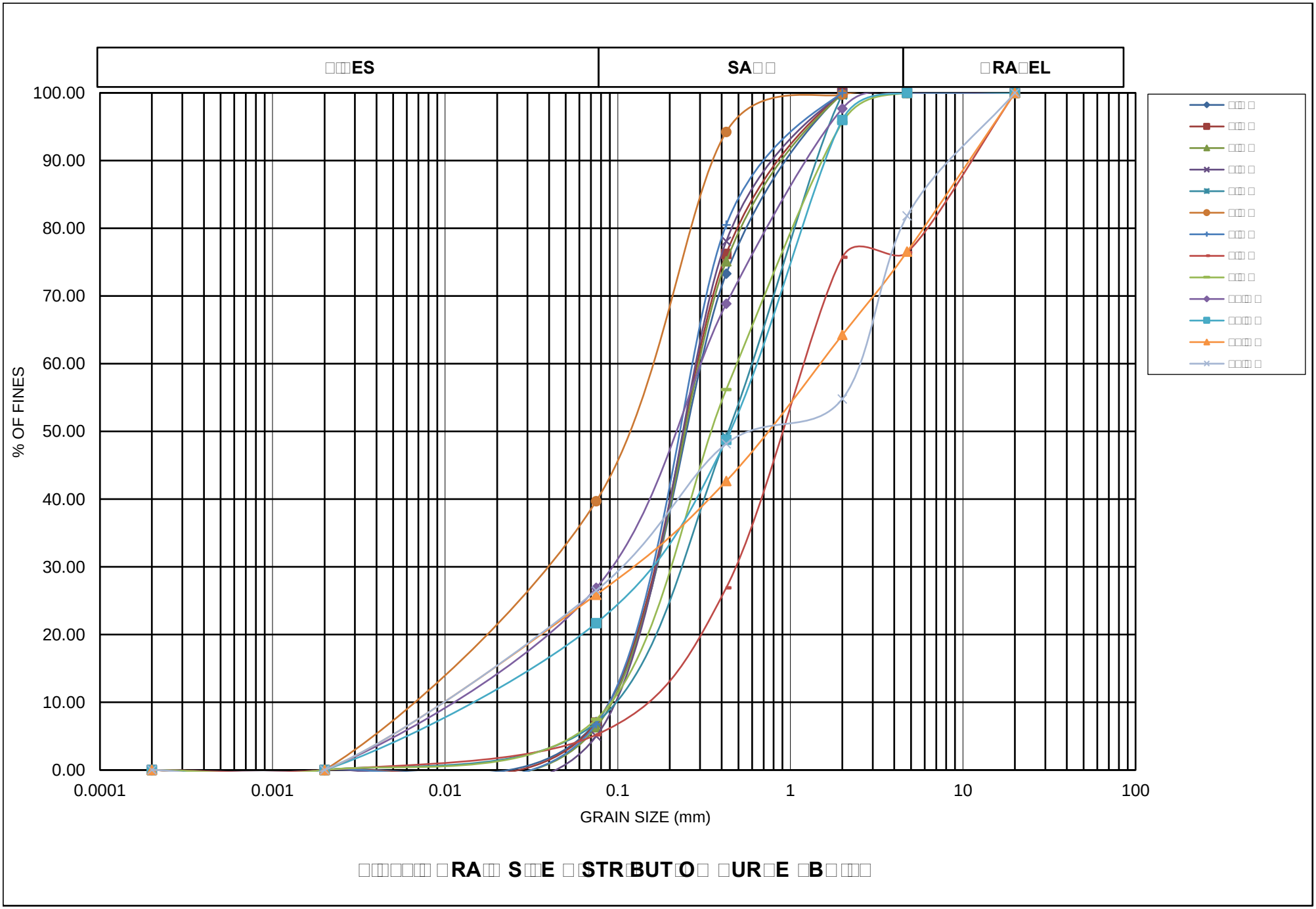
Residual Soil,Residual Soil to Completely Weathered & Completely Weathered Rock

FIG.No.2.4 CROSS SECTIONAL VARIATION OF SUB SOIL PROFILE THROUGH BH-01 TO 03

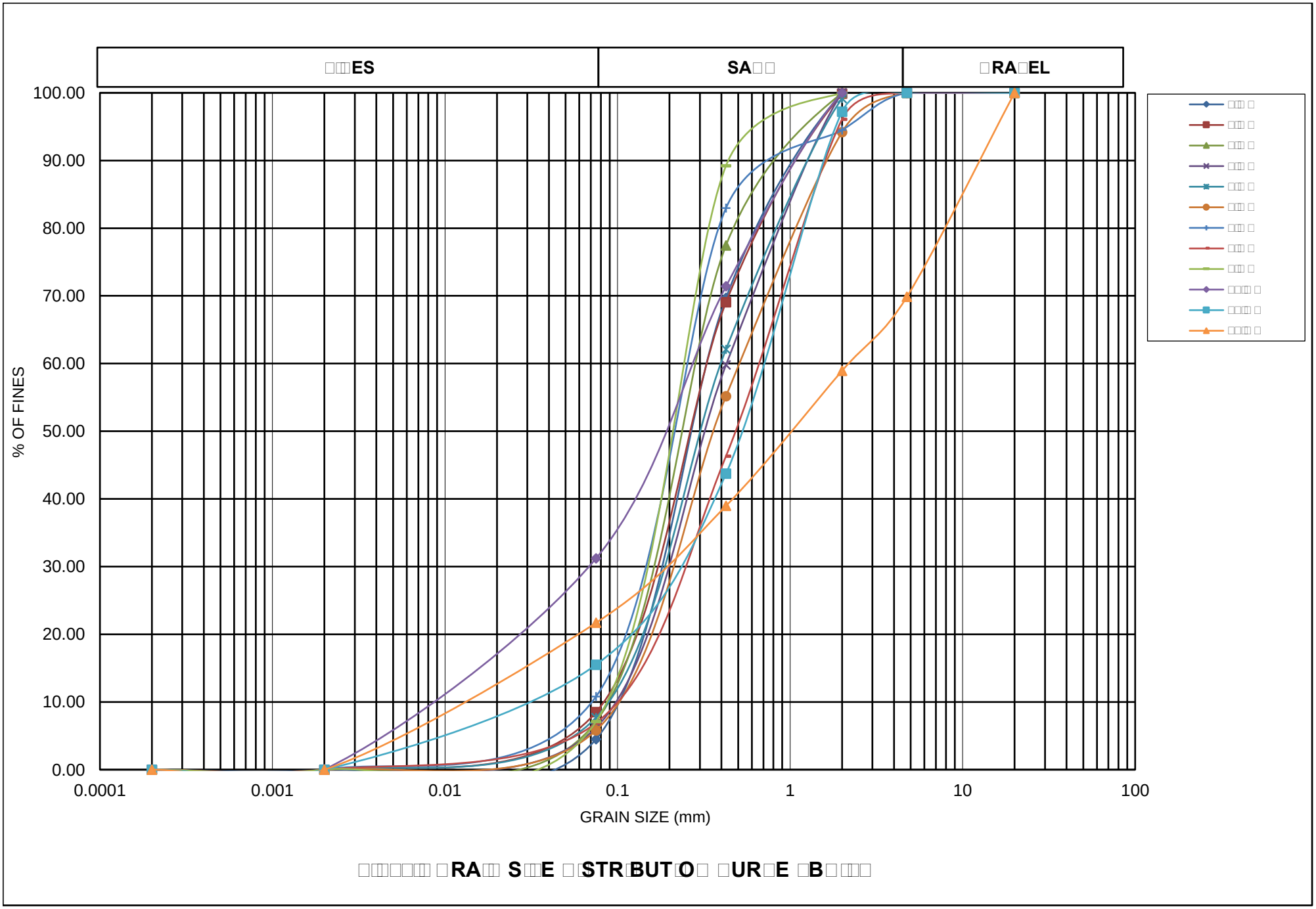
GRAIN SIZE DISTRIBUTION CURVE



□□□□□□□ □RA□□ S□□E □□STR□BUT□O□ □UR□E □B□□□□

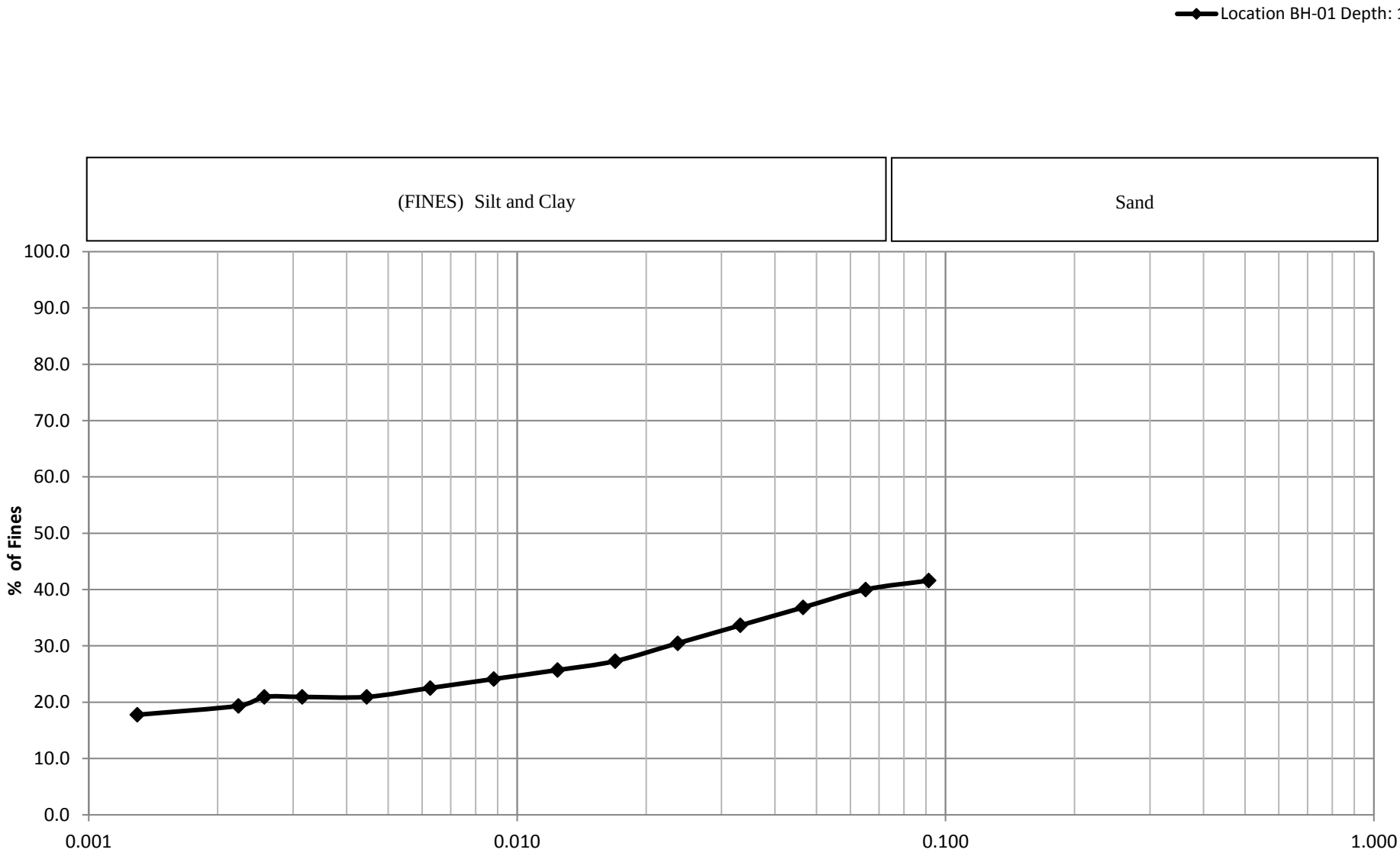


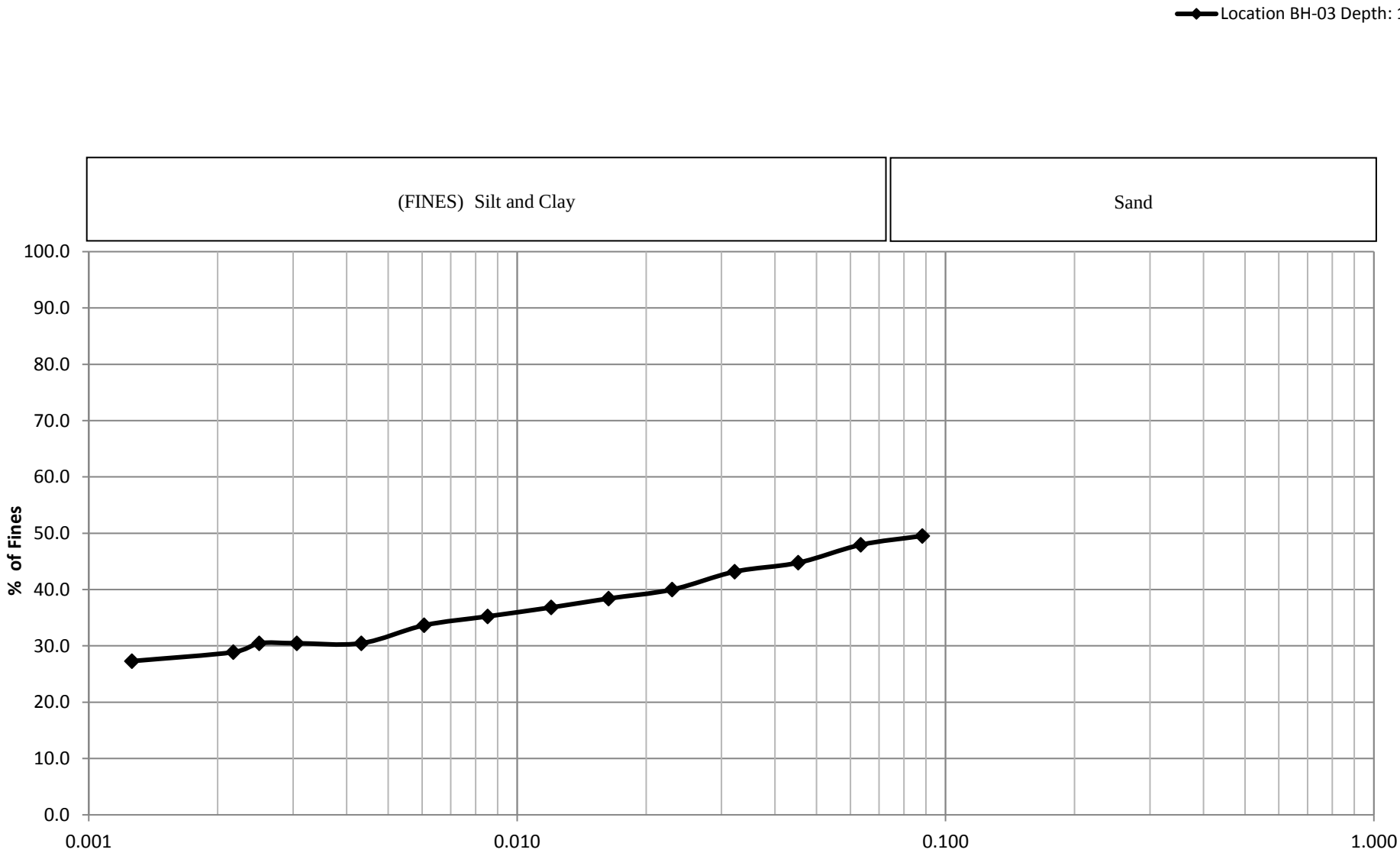
□□□□□□ □RA□□ S□□E □□STR□BUT□O□ □UR□E □B□ □□□



□□□□□□□ □RA□□ S□□E □□STR□BUT□O□ □UR□E □B□□□□

HYDROMETER ANALYSIS CURVE


Location BH-01 Depth: 10.50m
(FINES) Silt and Clay
Sand
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
% of Fines
0.001
0.010
0.100
1.000
Particle Size Diameter (mm)


Location BH-03 Depth: 10.50m
(FINES) Silt and Clay
Sand
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
% of Fines
0.001
0.010
0.100
1.000
Particle Size Diameter (mm)

LABORATORY TEST RESULTS

GEOMARINE
THE SPIRIT OF ENGINEERING

Phone No.: 044-24481485, 044-24480305
ULR No :TC1141023000000042F

LABORATORY TEST RE□ORT

□EOMAR□□E □O□SULTA□TS □□T LT□□□EOTE□□□□□AL LABORATORY
□O□□□ □[d] MA□□ ROA□□□A□□A□A □A□AR E□T□□
□OTT□□A□□AM□□□E□□A□

TC-11410

□□□ □ □ Addr□□□ □□□□□ □□□□□□ □r	**M□□ □□A□TA□YA □OU□□AT□O□S □□T LT□**	**□□□□□□ □r R□□□r□□□□**	By Email
S□□ □□□ □□□□r□□□□□	Soil Sample	**□□r□□d □□T□□□□□**	09/05/2023 to 12/05/2023
S□□r□□ □□S□□ □□□	Customer Supplied- Borehole No. BH-01	**S□□ □□□ d□□□□□□□□□□ □□□ □□r**	GMC/0423/661
S□□ □□□ □□□d□□□□	Satisfactory	**T□□□R□□□r□□ □□**	GT-2569
T□□□M□□□□d	As per Bureau of Indian Standards	**R□□□r□□ □□□**	12/05/2023
S□□ □□□R□□□□□□ □□□	09/05/2023	**T□□□R□□□r□□□□□**	One Page

T□□□□□□□ L□□□r□□□r□ □□□□□□□□□□□ □□S□□S□□ □□□□ r□□ B□□□□

S□□ □□□ □□□□	S□T"" □□□□	T□□□ □S□□ □□	□□□□ □r□□□d □□□ □											□□r□□ □r□□□d □□□ □										
			Moisture Content (%) AS □ER □S □□□□ □□ □□□□RA □□□□	LIQUID LIMIT (%) AS □ER □S □□□□ □□ □□□□RA □□□□	PLASTIC LIMIT (%) AS □ER □S □□□□ □□ □□□□RA □□□□	□□□□□□□□□□ □□LL□L	□□□□□□□□□□ □□LL□M	SHRINKAGE LIMIT (%) AS □ER □S □□□□ □□ □□□□RA □□□□	FREE SWELL INDEX (%) AS □ER □S □□□□ □□ □□□□RA □□□□	□□□□□□□□	□□□□□□□□ □□ R□□□□□ □□ A□A □□□□	S□□□□□□□	SPECIFIC GRAVITY AS □ER □S □□□□ □□ □□□□ SE□□□□□□□□□□ RA □□□□□	GRAIN SIZE ANALYSIS AS □ER □S □□□□□ □□ □□□ □□□□□□□□□ RA□□□□□						□□□□	□□□□	□□□□	Uniformity Co-Efficient □u □□□	Co-Efficient of Curvature □□□	R□□□□□□□ □□□□□□	S□□□□□□□□□	
														□r□□□□□□	□□□r□□□	M□d□□□	□□□□	S□□□□□	□□□□							□r□□□□	S□□d
0.5	35	SS	12.3	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.5	19.9	72.8	6.7		-	-	-	-	-	Dense	<50%	SP-SM
1.25	36	SS	10.2	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	27.7	66.1	6.2		-	-	-	-	-	Dense	<50%	SP-SM
2.0	46	SS	10.8	-	-	-	-	-	-	CG>50%	-	-	2.63	0.0	0.0	45.5	51.3	3.2		-	-	-	-	-	Dense	<50%	SP
3.0	58	SS	14.2	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	27.1	67.1	5.8		-	-	-	-	-	V.Dense	<50%	SP-SM
4.0	44	SS	16.7	-	-	-	-	-	-	CG>50%	-	-	-	0.0	1.0	46.6	45.6	6.7		-	-	-	-	-	Dense	<50%	SP-SM
5.0	36	SS	15.9	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.3	52.1	42.9	4.7		-	-	-	-	-	Dense	<50%	SP
6.0	>100	SS	15.6	-	-	-	-	-	-	CG>50%	-	-	-	0.0	3.1	34.0	55.4	7.5		-	-	-	-	-	V.Dense	<50%	SP-SM
7.5	>100	SS	14.3	-	-	-	-	-	-	CG>50%	-	-	-	0.0	1.4	54.3	39.1	5.1		-	-	-	-	-	V.Dense	<50%	SP-SM
9.0	74	SS	13.2	-	-	-	-	-	-	CG>50%	-	-	2.64	4.4	3.2	39.3	44.3	8.8		-	-	-	-	-	V.Dense	<50%	SP-SM
10.5	38	SS	13.3	19.4	Non Plastic				9.1	CG>50%	-	-	-	0.0	0.0	27.2	45.1	21.8	5.8	-	-	-	-	-	Dense	<50%	SM
12.0	22	SS	11.7	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.6	39.5	35.8	24.1		-	-	-	-	-	M.Dense	<50%	SM
13.5	65	SS	12.4	Little / Non Plastic Binder					0.0	CG>50%	-	-	-	6.2	16.5	27.6	19.8	30.0		-	-	-	-	-	V.Dense	<50%	SM
15.0	>100	SS	24.9						0.0	CG>50%	-	-	-	17.1	8.0	14.2	26.5	34.2		-	-	-	-	-	V.Dense	<50%	SM
16.5	>100	SS	14.9	41.1	24.8	16.3	1.6	-	7.7	CG>50%	Above	-	-	13.9	3.5	11.3	28.3	43.1		-	-	-	-	-	V.Dense	<50%	SC

□□E□□ O□ RE□ORT□□

Terms and Conditions

(1) The test results furnished corresponds to the sample received
(2) The tested sample will not be retained for more than 45 days from the date of issue of test report except in the case as required by the applicable regulations.
(3) Any correction in this reports invalidates the reports

A□□□□r□□d S□□□□□□r□

A. VINOTH
□T□□□□□□□□M□□□□□r□

GEOMARINE
THE SPIRIT OF ENGINEERING

Phone No.: 044-24481485, 044-24480305
ULR No :TC1141023000000042F

LABORATORY TEST RE□ORT

□EOMAR□E □O□SULTA□TS □□T LT□□□EOTE□□□□AL LABORATORY
□O□□□ □[d] MA□ ROA□□□A□□A□A □A□AR E□T□□
□OTT□A□□AM□□□E□□A□

TC-11410

□□□ □ □ Addr□□□ □□□□□ □□□□□□ □r	**M□ □□A□TA□YA □OU□□AT□O□S □□T LT□**	**□□□□□□ □r R□□r□□□□**	By Email
S□□ □□ □□□r□□□□□	Soil Sample	**□□r□d □□T□□□□□**	09/05/2023 to 12/05/2023
S□□r□□ □□S□□ □□	Customer Supplied- Borehole No. BH-02	**S□□ □□ d□□□□□□□□□ □□□ □□r**	GMC/0423/661
S□□ □□ □□□d□□□	Satisfactory	**T□□□R□□□r□□ □□**	GT-2569
T□□□M□□□d	As per Bureau of Indian Standards	**R□□□r□□ □□**	12/05/2023
S□□ □□ R□□□□□□ □□	09/05/2023	**T□□□R□□□r□□□□□**	One Page

T□□□□□□ L□□□r□□r□ □□□□□□□□□ □□S□□S□□ □□□ r□□ B□□□

S□□ □□□	S□T"" □□	T□□ □S□	□□□ □r□□d □□										□□r□□ □r□□d □□									
			Moisture Content (%) AS □ER IS □□□ RA□□□	LIQUID LIMIT (%) AS □ER IS □□□ RA□□□	PLASTIC LIMIT (%) AS □ER IS □□□ RA□□□	□□□ LL□	□□□ LL□M	SHRINKAGE LIMIT (%) AS □ER IS □□□ RA□□□	FREE SWELL INDEX (%) AS □ER IS □□□ RA□□□	□□□	□□□ R□□ AA□□	S□	SPECIFIC GRAVITY AS □ER IS □□□ SE□□□□□□ RA□□□	GRAIN SIZE ANALYSIS AS □ER IS □□□ RA□□□						□□	□□	□□	Uniformity Co-Efficient u	Co-Efficient of Curvature	R□□□	S□□□□□□	
															M□d		S							□r	S□d
0.5	37	SS	9.8	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	26.7	66.2	7.1	-	-	-	-	-	Dense	<50%	SP-SM
1.25	41	SS	8.6	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	23.8	69.2	7.0	-	-	-	-	-	Dense	<50%	SP-SM
2.0	54	SS	9.1	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.2	24.7	68.8	6.3	-	-	-	-	-	V.Dense	<50%	SP-SM
3.0	75	SS	15.8	-	-	-	-	-	-	CG>50%	-	-	2.61	0.0	0.0	21.9	73.1	5.0	-	-	-	-	-	V.Dense	<50%	SP-SM
4.0	69	SS	13.7	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.3	50.5	42.2	7.0	-	-	-	-	-	V.Dense	<50%	SP-SM
5.0	>100	SS	21.3	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.3	5.5	54.5	39.7	-	-	-	-	-	V.Dense	<50%	SM
6.0	>100	SS	18.6	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	19.5	73.7	6.8	-	-	-	-	-	V.Dense	<50%	SP-SM
7.5	>100	SS	15.3	-	-	-	-	-	-	CG>50%	-	-	-	23.6	0.7	48.8	21.7	5.2	-	-	-	-	-	V.Dense	<50%	SP-SM
9.0	>100	SS	15.8	-	-	-	-	-	-	CG>50%	-	-	2.63	0.0	4.4	39.5	48.7	7.5	-	-	-	-	-	V.Dense	<50%	SP-SM
10.5	38	SS	14.6	21.2	16.4	4.9	1.4	-	20.0	CG>50%	Above	-	-	0.0	2.3	28.8	42.0	26.9	-	-	-	-	-	Dense	<50%	SC
12.0	20	SS	11.7	Little / Non Plastic Binder					-	CG>50%	-	-	-	0.0	4.0	47.3	27.1	21.7	-	-	-	-	-	M.Dense	<50%	SM
14.0	56	SS	12.8						0.0	CG>50%	-	-	-	23.5	12.3	21.6	16.8	25.9	-	-	-	-	-	V.Dense	<50%	SM
16.0	>100	SS	10.6	-	-	-	-	-	-	CG>50%	-	-	-	18.2	27.0	6.6	21.7	26.5	-	-	-	-	-	V.Dense	<50%	SM

□□E□□ O□ RE□ORT□□

Terms and Conditions

(1) The test results furnished corresponds to the sample received

(2) The tested sample will not be retained for more than 45 days from the date of issue of test report except in the case as required by the applicable regulations.

(3) Any correction in this reports invalidates the reports

A□□□r□□d S□□□□□r□

A. VINOTH
□T□□□□□□M□□□□r□

GEOMARINE
THE SPIRIT OF ENGINEERING

Phone No.: 044-24481485, 044-24480305
ULR No :TC1141023000000042F

LABORATORY TEST RE□ORT

□EOMAR□E □O□SULTA□TS □□T LT□□□EOTE□□□□AL LABORATORY
□O□□□ □[d] MA□ ROA□□□A□□A□A □A□AR E□T□□
□OTT□A□□AM□□□E□□A□

TC-11410

□□□ □ □ Addr□□□ □□□□□ □□□□□□ □r	**M□□ □□A□TA□YA □OU□□AT□O□S □□T LT□**	**□□□□□□ □r R□□r□□□□**	By Email
S□□ □□□ □□□□r□□□□	Soil Sample	**□□r□d □□T□□□□□**	09/05/2023 to 12/05/2023
S□□r□□ □□S□□ □□	Customer Supplied- Borehole No. BH-03	**S□□ □□□ d□□□□□□□□□ □□□ □□r**	GMC/0423/661
S□□ □□□ □□□d□□□	Satisfactory	**T□□□R□□□r□□ □□**	GT-2569
T□□□M□□□d	As per Bureau of Indian Standards	**R□□□r□□ □□□**	12/05/2023
S□□ □□□R□□□□□□ □□	09/05/2023	**T□□□R□□□r□□□□□**	One Page

T□□□□□□□ L□□□r□□r□ □□□□□□□□□□ □□S□□S□□ □□□ r□□ B□□□

S	S□T""	T	□□□ r□□d										□□r□□ r□d										
			Moisture Content (%) AS □ER IS □□□ RA	LIQUID LIMIT (%) AS □ER IS □□□ RA	PLASTIC LIMIT (%) AS □ER IS □□□ RA			SHRINKAGE LIMIT (%) AS □ER IS □□□ RA	FREE SWELL INDEX (%) AS □ER IS □□□ RA			SPECIFIC GRAVITY AS □ER IS □□□ SE	GRAIN SIZE ANALYSIS AS □ER IS □□□ RA										
0.5	27	SS	13.8	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	30.3	65.2	4.5		-	-	-	-	-	M.Dense	<50%	SP
1.25	31	SS	12.1	-	-	-	-	-	-	CG>50%	-	-	2.62	0.0	0.1	30.8	60.6	8.5		-	-	-	-	-	Dense	<50%	SP-SM
2.0	51	SS	9.4	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	22.6	70.4	7.1		-	-	-	-	-	V.Dense	<50%	SP-SM
3.0	82	SS	11.8	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	40.2	53.6	6.2		-	-	-	-	-	V.Dense	<50%	SP-SM
4.0	97	SS	14.6	-	-	-	-	-	-	CG>50%	-	-	2.63	0.0	0.8	37.1	54.4	7.7		-	-	-	-	-	V.Dense	<50%	SP-SM
5.0	91	SS	12.6	-	-	-	-	-	-	CG>50%	-	-	-	0.0	5.8	39.0	49.4	5.8		-	-	-	-	-	V.Dense	<50%	SP-SM
6.0	>100	SS	18.7	-	-	-	-	-	-	CG>50%	-	-	-	0.0	5.5	11.5	72.2	10.8		-	-	-	-	-	V.Dense	<50%	SP-SM
7.5	>100	SS	12.4	-	-	-	-	-	-	CG>50%	-	-	-	0.0	3.9	49.8	39.4	6.9		-	-	-	-	-	V.Dense	<50%	SP-SM
9.0	>100	SS	16.6	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	10.8	82.1	7.1		-	-	-	-	-	V.Dense	<50%	SP-SM
10.5	24	SS	13.7	28.8	18.7	10.0	1.5	-	16.7	CG>50%	Above	-	-	0.0	0.0	28.6	40.2	22.2	9.0	-	-	-	-	-	M.Dense	<50%	SC
12.0	38	SS	11.4	Little / Non Plastic Binder					18.2	CG>50%	-	-	-	0.0	2.8	53.5	28.2	15.5		-	-	-	-	-	Dense	<50%	SM
14.0	>100	SS	12.1						0.0	CG>50%	-	-	2.65	30.2	10.9	20.0	17.3	21.7		-	-	-	-	-	V.Dense	<50%	SM
16.0	>100	WS	Sample Failed./ Drill Cutting Checked & Collected											0.0	7.4	76.5	15.0	1.0		-	-	-	-	-	V.Dense	<50%	-

□□E□□ O□ RE□ORT□□

Terms and Conditions

(1) The test results furnished corresponds to the sample received
(2) The tested sample will not be retained for more than 45 days from the date of issue of test report except in the case as required by the applicable regulations.
(3) Any correction in this reports invalidates the reports

A□□□r□□d S□□□□□r□

A. VINOTH
□T□□□□□□M□□□□r□

EM AL LABORATORY TEST RESULTS

GEOMARINE
THE SPIRIT OF ENGINEERING
Phone No.: 044-24480305
ULR No : TC114102300000042F

LABORATORY TEST REPORT
GEOMARINE CONSULTANTS PVT LTD- GEOTECHNICAL LABORATORY
NO.11 2nd MAIN ROAD, KANNAPA NAGAR EXTN,
KOTTIVAKKAM, CHENNAI

TC-11410

Sample Description	Water and Soil	Reference No. & Date	GMC/0423/661
Sample Received From	Customer Supplied	Date of Testing	10/05/2023 to 11/05/2023
Sample Condition	Satisfactory	Report Date	12/05/2023
Test Method	As per Bureau of Indian Standards	Test Report No.	GT-2569
Sample Received Date	09/05/2023	Total No. of Pages	One Page

Sl. No.	Borehole No.	Water Sample				Soil Sample	
		pH Value of the Sample	Chlorides as Cl	Sulphates as SO_4	Total Dissolved Solids	pH Value of the Sample	Chlorides as Cl
		AS PER IS 3025 (P-XI) - 2022		AS PER APHA 23rd Edn.2017-4500	AS PER IS 3025(P-XXII) - 1988, RA-2019		AS PER IS 2720 (P-XXVI) - 1987, RA-2021
1.0	BH-01	4.00	8.29	41.3	90.5	1.25	7.62
2.0	BH-02	4.00	7.85	39.9	28.6	1.25	8.15
3.0	BH-03	3.80	8.29	34.1	147.6	1.25	8.01

END OF REPORT

Authorised Signatory

A. VINOTH
Technical Manager

Terms and Conditions

(1) The test results furnished corresponds to the sample received

(2) The tested sample will not be retained for more than 30 days from the date of issue of test report except in the case as required by the applicable regulations.

(3) Any correction in this reports invalidates the reports

T□□□□□□□□□□ R□□□□□□□ □□□ □□□ □□□□□T□□□□□□r S□□□S□□ □□□				
SL □□□	B□r□ □□□□□□ □□	S□□□□□□□□□		
		□□□□□□ □□S□□ □□□ □□	SUL□□ATES □□ □□□□□□	□□LOR□□ES □□ □□□□□□
1.0	BH-01	1.25	29.6	38.1
2.0	BH-02	1.25	38.3	28.6
3.0	BH-03	1.25	40.0	19.0

CHAPTER 3

GEOLOGY & SUB SURFACE STRATIFICATION

3.1 PREAMBLE

Geotechnical investigation carried out at a specific site provides location specific sub surface engineering characteristics. However in major project sites where the construction activities spread over a very large area location specific sub surface strata characteristics are studied together with the geological mapping data.

This is required to incorporate the impact of any documented macro-level geological characteristics of the region on the foundation design, irrespective of the location specific sub surface strata characteristics.

In view on the above, though it is beyond the scope of the present study to carry out macro-level geological investigation the regional geology based on the published data is presented and discussed.

3.2 CLIMATE AND RAINFALL

The study area receives the rain under the influence of both southeast and northeast monsoons. Predominantly northeast monsoon contributes rainfall and most of the precipitation occurs in the form of cyclonic storm caused due to the depressions in Bay of Bengal. The north east monsoon occurs between October & December. The southwest monsoon rainfall is highly erratic and summer rains are negligible.

The normal annual rainfall over the study area varies from 1100 mm to 1200mm.

3.3 GEOMORPHOLOGY

Chennai district forms part of coastal plains of northern Tamil Nadu. Major part of the district is having flat topography with very gentle slope towards east. The altitudes of land surface vary from 10 m above MSL in the west to sea level in the east.

Fluvial, marine and erosional landforms are noticed in the district. Marine transgression and regressions and neo-tectonic activity during the recent past have influenced the morphology and resulted in various present landforms.

Meandering streams with small sand bars are present along the course of Adyar River. The pediment and buried pediment in Guindy area in and around the reserved forest, is the only area where the ecological system is less disturbed, while the other areas are completely disturbed by built up area with large-scale human interference and pollution.

3.4 GEOLOGY OF THE AREA AND STRUCT

Chennai district is underlain by various geological formations from ancient Archaean to the Recent Alluvium. The geological formations of the district can be grouped into three units, namely

i) Archaean crystalline rocks

ii) Gondwana (Consolidated Clay/Clayey Silt) and Tertiary sediments and

iii) Recent Alluvium.

The Archaean crystalline rocks of the district comprise chiefly of Charnockite, gneisses and the associated basic and ultra-basic intrusive dykes.

□□□ □EOLO□ □AL OR□ER O□ T□E STU□Y AREA□

The stratigraphy of the study area can be classified as recent formation which is underlain by basement rock of meta-igneous origin (hypersthene granite/ Charnockite rock)

Deposits of Recent Age

---------- Eparchean Unconformity ----------

Archaean Basement Rock (Charnockite Rock / Hypersthene Granite)

□□□ □ES□ □ SUB SO□L □RO□□LE□(WRT Foundation Engineering Application)

The sub soil characteristics obtained at the test location are further processed to arrive at the design soil parameters required for the design of sub structure using the following shear strength correlations with respect to the Standard Penetration Test Values of different layers.

- For Coarse Grained Material, Ref. IS: 6403 to estimate Angle of Shearing Resistance (Reproduced and shown in Fig.A1)
- For Fine Grained Material, Ref. Terzaghi & Peck, 1948, to estimate Unconfined Compressive Strength (Reproduced and shown in Fig.A2)

Based on the above, the average design soil characteristics are given below:

RE□ERE□□E BORE □OLE				B□□□□	R□□R□L□□□□ □L□□□ □□			□□□□		
L□□r □□□	L□□r T□□□□□ □			T□□□ □□S□r□□□	□□□□r	A□□□□□□ S□T	R□□□□□□ □	□□□□□□□□ □	γ□□□ □	S□□r □□r□□ □□r□	
	T□□ B□L	B□□□ B□L	T□□□□□□□							□□□□ □	□□□□ □
1.0	0.00	6.00	6.00	Silty Sand	Brown	43	Dense	-	20	-	39.425
2.0	6.00	10.50	4.50	Silty Sand	Brown, Grey Brown	100	Very Dense	-	21	-	42.5
3.0	10.50	13.50	3.00	Silty Sand	Grey	30	Medium Dense	-	19	-	36
4.0	13.50	16.50	3.00	Residual Soil	Green Grey	100	Very Dense	-	21	-	42.5
5.0	16.50	16.90	0.40	Completely Weathered Rock	Grey Brown	100	Very Dense	-	21	-	42.5

RE□ERE□□E BORE □OLE					B□ □□□	R□□R□L □□□□ □L□□ □□			□□□□		
L□□□r □□□	L□□□r T□□□□□ □			T□□□ □□S□r□□□	□□□□r	A□□□□□□□ S□T	R□□□□□□□ □	□□□□□□□□□	□	S□□□r □□r□□ □□□r□	
	T□□ B□L	B□□□ □ B□L	T□□□□□□□								
1.0	0.00	2.00	2.00	Silty Sand	Brown	39	Dense	-	19.5	-	38.475
2.0	2.00	5.00	3.00	Silty Sand	Brown	61	Very Dense	-	21	-	42.5
3.0	5.00	10.50	5.50	Silty Sand	Brown, Grey Brown	100	Very Dense	-	21	-	42.5
4.0	10.50	13.50	3.00	Clayey Sand	Grey,Green Grey	29	Medium Dense	-	19	-	35.7
5.0	13.50	16.10	2.60	Residual Soil	Green Grey	100	Very Dense	-	21	-	42.5

RE□ERE□□E BORE □OLE					B□ □□□	R□□R□L □□□□ □L□□ □□			□□□□		
L□□□r □□□	L□□□r T□□□□□ □			T□□□ □□S□r□□□	□□□□r	A□□□□□□□ S□T	R□□□□□□□ □	□□□□□□□□□	□	S□□□r □□r□□ □□□r□	
	T□□ B□L	B□□□ □ B□L	T□□□□□□□								
1.0	0.00	2.00	2.00	Silty Sand	Brown	29	Medium Dense	-	19	-	35.7
2.0	2.00	3.00	1.00	Silty Sand	Brown	51	Very Dense	-	20.5	-	41.15
3.0	3.00	10.50	7.50	Silty Sand	Brown,Grey Brown	100	Very Dense	-	21	-	42.5
4.0	10.50	14.20	3.70	Clayey Sand	Grey, Green Grey	31	Dense	-	19.5	-	36.275
5.0	14.20	16.10	1.90	Residual Soil	Green Grey	100	Very Dense	-	21	-	42.5

FOUNDATION SYSTEM

FOUNDATION SYSTEM

5.1 PREAMBLE

In the design of foundation system, the stress-strain compatibility of the super structure, sub structure and the bearing strata should be satisfied both individually and as a combined system. In view of this, the following data are needed for the design of foundation system, defined in terms of the type of sub structure and the bearing strata characteristics.

- The super structure characteristics along with the loading pattern on the sub structure
- The sub soil characteristics that define the required substructure configuration for a safe transfer of super-structural loads to the bearing strata

Considering the above aspects of the foundation design, the suitable type of foundation system is presented below.

5.2 PROPOSED STRUCTURES

An understanding of the proposed construction and the order of loads on the foundations is needed for choosing the appropriate foundation system. In the present case, the proposed structure is configured with stilt and five upper floors which is meant for residential occupancy. For this kind of structure, the column loads could vary between 1500 kN to 2000 kN.

The above mentioned loads have no bearing on the design of either sub or super structures and are mentioned just to provide an insight to choose an appropriate foundation system with respect to subsoil conditions.

5.3 SUB SOIL STRATIFICATION

The sub soil in the project location is classified into:

0.0m to 2.0m	Dense, Silty Sand/Poorly Graded Sand
2.0m to 10.5m	Very Dense, Silty Sand/Poorly Graded Sand
10.5m to 14.0m	Medium Dense & Dense, Clayey Sand to Silty Sand with Binder
14.0m to 16.0m	Very Dense, Sand Followed By Disintegrated Granitic Rock

5.4 FOUNDATION SYSTEM

In the project site the sub soil characteristics below the existing fill are good in both shear and settlement considerations, hence for the kind of proposed structure and sub soil conditions shallow foundation can be adopted.

The shallow foundation can be isolated footings and can be located at a depth of 1.8m below the existing ground level. The footing can be designed for an allowable net safe bearing pressure of 300 kPa.

Typical computations are presented in Annexure-I.

RECOMMENDATIONS

RE□OMME□□AT□O□S

- For the proposed configuration of the structure and the sub soil condition shallow foundation can be adopted.
- Isolated footing can be located at a depth of 1.8m below the existing ground level and can be designed for an allowable safe bearing pressure of 300 kPa.
- All the columns can be connected with graded beams in either direction at plinth level.
- Excavated earth is suitable for backfilling purposes.
- The chlorides content in ground water & soil-water extract is less than the permissible limit of 500 mg/l as per IS 456 Table 1.0. Hence no special reinforcement is required for the construction
- Corresponding to the sulphate content in 2:1 Water-Soil extract and ground water use Table 4.0 of IS 456 Clause 2.0 for minimum cement content and maximum water cement ratio. Hence no special cement is required for the construction.

AUT□OR□SE□ S□□ □ATORY

□R□□ □□□□RASA□
□EOMAR□□E □O□SULTA□TS □R□□ATE L□M□TE□

A□□E□URE□□

GEOMARINE
THE SPIRIT OF ENGINEERING

TY□□□AL BEAR□□□ □A□A□TY □OM□UTAT□O□S □OR S□ALLO□ □OU□□AT□O□S

□□□ □OM□UTAT□O□ O□ BEAR□□□ □A□A□TY AS □ER □S□□□□□

R□□□B□ □□□

□□□ □ □□□ □r□□□□□ □□□ □

Shape of the Foundation	Square
Depth of Foundation in below E.G.L"Df" (m)	1.80
Breadth of Footing "B" (m)	1.00
Length of Footing "L" (m)	1.00
B/L	1.00
Inclination of Vertical Load with the Vertical (a)	0.00

□□□ S□□□ □□□ □

Type of Effective Bearing Strata :	Sand
Average SPT-value of the Bearing Strata :	31.00
Type of Shear Failure:	General
Angle of Shearing Resistance	36.28

□□□ □ □□□□ □r□ □□r□

Bulk Density of Soil above the foundation depth (g_{bulk})	18.00
Effective Overburden pressure at foundation level (q)	14.40
Water Table Correction Factor (w')	0.50
Bearing Capacity Factors:	
N_c =	N/A
N_q =	41.18
N_g =	63.68
Shape Factors:	
S_c =	-
S_q =	1.20
S_g =	0.80
Depth Factors :	
D_c =	-
D_q =	1.03
D_g =	1.03
Inclination Factor:	
I_c =	1.00
I_q =	1.00
I_g =	1.00

□□□ U□□□ □□□ B□□r□□ □ □□□□□□□ □□ □□□

Qu=q*(Nq-1)*Sq*Dq*Iq + 0.5*B*g*Ng*Sg*Dg*Ig*w'	949.07	kPa
(g should be read as gama)		

□□□ S□□□ B□□r□□ □ □□□□□□□ □□ □□□□□

Factor of Safety (F.S.) :	2.50	
Qsafe :	379.63	kPa
S□□ □ □□□	□□□	□□□

□ □□□ □□□□□□□ □□S□□□□□ □□□□r M□□□ □□ □r□□□r□ □□d S□□ □□□□□□□□□□ □□□
□□r S□□□□□□ r□□R□□E□□□□ E□□□□□ A□□□□□□

The immediate elastic settlement (S_i)= $qB(1-m^2)*I/E_s$

q= bearing pressure	300.00
Poission's Ratio (μ)	0.20
Modulus of Elasticity (E_s)(Ref. Joseph E Bowels,1996,page316,Table5.6, Japanese design standards)	
Modulus of Elasticity (E_s)	80600.00
Size of footing considered for maxium settlement	1.00
Influence factor	0.95
Rigidity Factor	0.80
Elastic Settlement (DH_i)	2.72 mm
□□□	mm

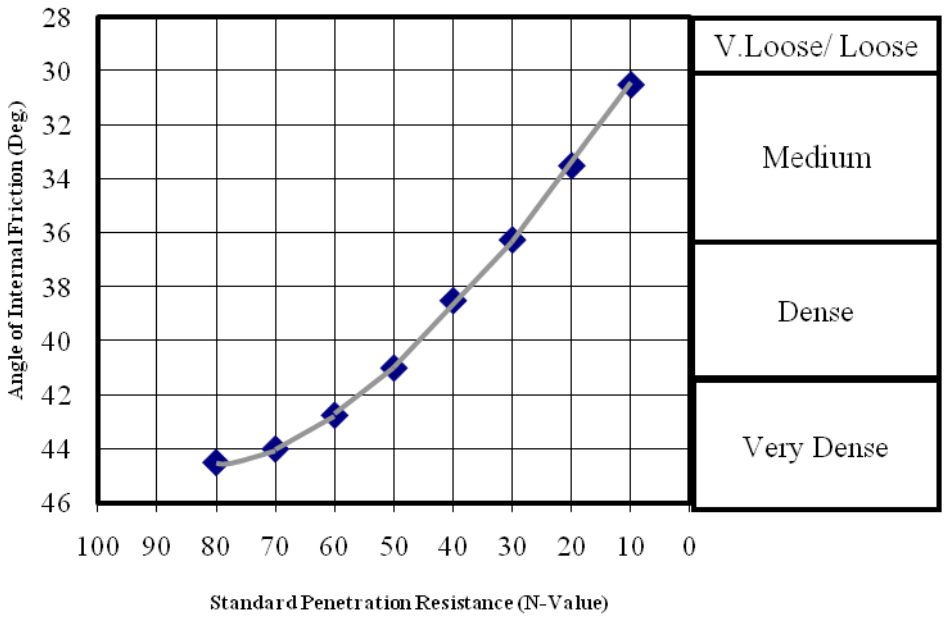


FIG. A1 Relation Ship between Angle of Internal Friction & N-value (Reproduced from IS:6403-1981)

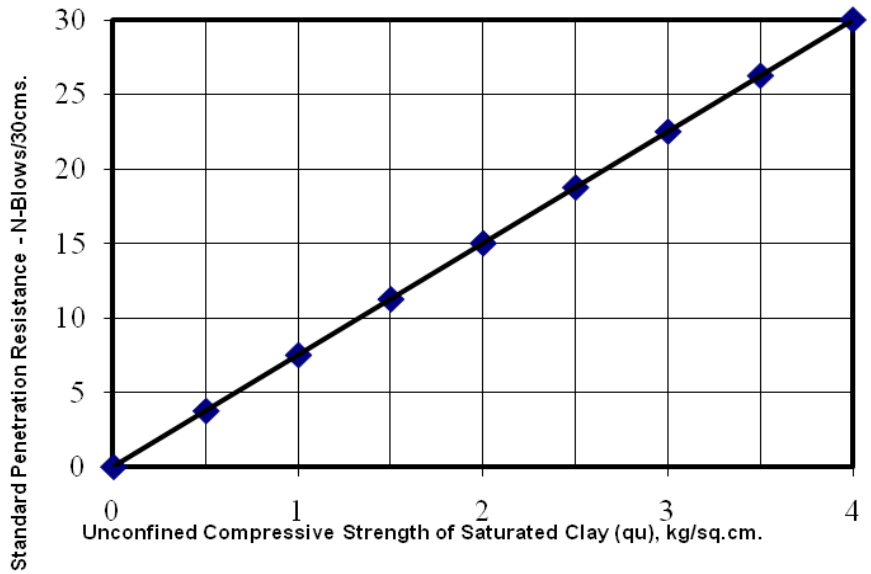


FIG. A2 : Relationship between UCC & SPT-Value (N) of Saturated Clay (AfterTerzhagi & Peck, 1948)

A□ □E□URE □□□

[CHAITANYA FOUNDATION]

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No. BH:01
PAGE No. 1

PROJECT NAME: PROPOSED FOR RESIDENCY BUILDING - CHENNIAT
DIA OF BORE HOLE: 150mm / 100mm
LOCATION: MUTTUKADU | MACHINE No.: HR:01 | CHAINAGE (m):
BORE START DATE: 05-05-2023
STRUCTURE: S+5 | DRILLING METHOD: Rotary | CO-ORDINATES: N, E
BORE END DATE: 05-05-2023
JOB CODE: | FLUSHING MEDIUM: Bentonite
TOTAL DRILLING DAYS: 1

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	Layer Data: Depth (m)	Geotechnical Description
1	05-05-2023	9	08	SC			12	18	17	35	0.50	1	SS		Dense, Brownish, Silty SAND
		9	09												
		9	19	SC			10	15	21	36	1.25	2	SS		Dense, Brownish, SAND
2		9	20												
		9	30	SC			9	21	25	46	2.00	3	SS		Dense, Brownish, SAND
		9	31												
3		9	42	SC			12	28	30	58	3.00	4	SS		Very Dense, Brownish, SAND
		9	43												
		9	51	SC			25	27	17	44	4.00	5	SS		Dense, yellowish Brown, SAND
4		9	52												
		10	02	SC			10	12	24	36	5.00	6	SS		Dense, Brownish, SAND
5		10	03												
		10	16	SC			22	55	61	116	6.00	7	SS		Very Dense, Brownish, SAND
6		10	17												
		10	32	SC			No penetration 10cm				7.50	8	SS		Very Dense, Greyish Brown, SAND
7		10	33				37	50blo		ND100					
		10	50	SC			21	36	38	74	9.00	9	SS		Very Dense, Brownish Grey, SAND with shell pieces
8		10	51												
		11	09	SC			9	17	21	38	10.50	10	SS		Dense, Brownish Grey, clayey Silty SAND
9		11	10												
10															

CS - Core Sample | DS - Disturbed Sample.
SS - Split Spoon Sample | SC - Soil Cutter
UDS-Undisturbed Sample | TCB - Tungsten Carbide Bit
WS - Wash Sample | DB - Diamond Bit

SUPERVISOR NAME: BASKAR. J
SIGNATURE:
DATE: 05/05/2023
CLIENT IN-CHARGE:

PROJECT SITE DETAILS
GROUND LEVEL (m):
WATER TABLE (m):
CASING DEPTH (m):

[CHAITANYA FOUNDATION]

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH : 01
PAGE No.	2
DIA OF BORE HOLE	150mm – 7 / 100mm
BORE START DATE	05-05-2023
BORE END DATE	05-05-2023
TOTAL DRILLING DAYS	1

PROJECT NAME	PROPOSED FOR RESIDENCY BUILDING - CHENNAI						
LOCATION	MUTTUKADU	MACHINE No.	HR : 01	CHAINAGE (m)			
STRUCTURE	S+5	DRILLING METHOD	Rotary	CO-ORDINATES	N		
JOB CODE		FLUSHING MEDIUM	Bentonite		E		

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	SPT Details: Blows/cm. 15-30	SPT Details: Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Layer Data: Depth (m)	Geotechnical Description
1															
2		11.37 / 11.39		SC			8	12	10	22	12.00	11	SS		Medium Dense, Greenish Grey, Silty SAND
3															
4		11.56 / 11.57		SC			16	26	39	65	13.50	12	SS		Very Dense, Whitish - Greenish Grey, Silty SAND with limestone pieces
5		12.22 / 12.24		SC			Hammer rebound 9cm / 50blows			N>100	15.00	13	SS		Very Dense, Brownish - Greenish Grey, clayey SILT
6		14.04 / 14.07		SC			40	51	9cm / 50blows	N>100	16.50	14	SS		Very Dense to weak, Greenish Grayish Brown, clayey SILT with WEATHER Rock Pieces
7															
8															
9															
0															

BORE HOLE TERMINATED AT 16.50 mth DEPTH.

CS - Core Sample	DS - Disturbed Sample	SUPERVISOR NAME	Baskar. J	PROJECT SITE DETAILS	
SS - Split Spoon Sample	SC - Soil Cutter	SIGNATURE		GROUND LEVEL (m)	
UDS-Undisturbed Sample	TCB - Tungsten Carbide Bit	DATE	05-05-2023	WATER TABLE (m)	
WS - Wash Sample	DB - Diamond Bit	CLIENT IN-CHARGE		CASING DEPTH (m)	

[CHAITANYA FOUNDATION]

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH:02
PAGE No.	1
DIA OF BORE HOLE	150mm 7 / 100mm
BORE START DATE	06-05-2023
BORE END DATE	06-05-2023
TOTAL DRILLING DAYS	1

PROJECT NAME	PROPOSED FOR RESIDENCY BUILDING - CHENNIAT				
LOCATION	MUTTUKADU	MACHINE No.	HR:01	CHAINAGE (m)	
STRUCTURE	S+5 floors	DRILLING METHOD	Rotary	CO-ORDINATES	N
JOB CODE		FLUSHING MEDIUM	Bentonite		E

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	SPT Details: Blows/cm. 15-30	SPT Details: Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Layer Data: Depth (m)	Layer Data: Geotechnical Description
0	06-05-2023	8.57													
		8.58		SC			9	16	21	37	0.50	1	SS		Dense, Brownish, Silty SAND
1		9.11													
		9.12		SC			10	19	22	41	1.25	2	SS		Dense, Brownish, Silty SAND
2		9.22													
		9.23		SC			12	26	28	54	2.00	3	SS		Very Dense, Brownish, SAND
3		9.32													
		9.33		SC			16	32	43	75	3.00	4	SS		Very Dense, Brownish, SAND
4		9.45													
		9.46		SC			35	38	31	69	4.00	5	SS		Very Dense, Brownish, SAND
5		9.58													
		9.59		SC			21	47	55	102	5.00	6	SS		Very Dense, Brownish, Silty SAND
							No penetration								
6		10.10													
		10.11		SC			28	8cm / 50blc		NV100	6.00	7	SS		Very Dense, Brownish SAND
7		10.25													
		10.26		SC			50	5cm / 50blc		NV100	7.50	8	SS		Very Dense, Brownish, SAND
8		10.41													
		10.42		SC			26	61	6cm / 40blc	NV100	9.00	9	SS		Very Dense, Brownish, SAND
9		11.02													
		11.03		SC			12	15	23	38	10.50	10	SS		Dense, Grayish, SAND with Shell pieces
10															

CS - Core Sample	DS - Disturbed Sample	SUPERVISOR NAME	BASKAR. J	PROJECT SITE DETAILS	
SS - Split Spoon Sample	SC - Soil Cutter	SIGNATURE		GROUND LEVEL (m)	
UDS-Undisturbed Sample	TCB - Tungsten Carbide Bit	DATE	06-05-2023	WATER TABLE (m)	4.00
WS - Wash Sample	DB - Diamond Bit	CLIENT IN-CHARGE		CASING DEPTH (m)	

[CHAITANYA FOUNDATION]

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH : 02
PAGE No.	2
DIA OF BORE HOLE	150mm / 100mm
BORE START DATE	06-05-2023
BORE END DATE	06-05-2023
TOTAL DRILLING DAYS	1

PROJECT NAME	PROPOSED FOR RESIDENCY BUILDING - CHENNAI					
LOCATION	MUTTUKADU	MACHINE No.	HR:01	CHAINAGE (m)		
STRUCTURE	S+5 floors	DRILLING METHOD	Rotary	CO-ORDINATES	N	
JOB CODE		FLUSHING MEDIUM	Bentonite		E	

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	SPT Details: Blows/cm. 15-30	SPT Details: Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Layer Data: Depth (m)	Geotechnical Description
1															
2		11	23												
		11	24	SC			10	10	10	20	12.00	11	SS		Medium Dense, Greenish Gray, Silty SAND
3															
4		11	43											13.80	
		11	44	SC			11	31	25	56	14.00	12	SS		Very Dense to Weak, Greyish Green, SOIL with Weathered Rock
5															
							hammer rebound								
6		12	14				7cm								
		12	18	SC			50/3"			NR/100	16.00	13	SS		Weak, Pinkish-Greenish Brown, COMPLETELY WEATHERED ROCK
7															BORE HOLE TERMINATED AT 16.00 mth DEPTH.
8															
9															
0															

CS - Core Sample	DS - Disturbed Sample.	SUPERVISOR NAME	BASKAR. J	PROJECT SITE DETAILS	
SS - Split Spoon Sample	SC - Soil Cutter	SIGNATURE		GROUND LEVEL (m)	
UDS-Undisturbed Sample	TCB - Tungsten Carbide Bit	DATE	06-05-2023	WATER TABLE (m)	4.00
WS - Wash Sample	DB - Diamond Bit	CLIENT IN-CHARGE		CASING DEPTH (m)	

[CHAITANYA FOUNDATION]

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No. BH:03
PAGE No. 1

PROJECT NAME: PROPOSED FOR RESIDENCY BUILDING - CHENNAI
DIA OF BORE HOLE: 150mm 7 / 100mm
LOCATION: MUTTUKADU | MACHINE No.: HR:01 | CHAINAGE (m):
STRUCTURE: S+5 floors | DRILLING METHOD: Rotary | CO-ORDINATES: N, E
JOB CODE: | FLUSHING MEDIUM: Bentonite
BORE START DATE: 08-05-2023
BORE END DATE: 08-05-2023
TOTAL DRILLING DAYS: 1

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	Blows/cm. 15-30	Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	Layer Data: Depth (m)	Geotechnical Description
1	08-05-2023	9.01	9.02	SC			10	13	14	27	0.50	1	SS		Medium Dense, Brownish, Silty SAND
1		9.10	9.11	SC			7	13	18	31	1.25	2	SS		Dense, Brownish, SAND
2		9.24	9.25	SC			13	22	29	51	2.00	3	SS		Very Dense, Brownish, SAND
3		9.33	9.34	SC			17	37	45	82	3.00	4	SS		Very Dense, Brownish, SAND
4		9.45	9.46	SC			29	46	51	97	4.00	5	SS		Very Dense, Brownish, SAND
5		9.59	10.00	SC			22	41	50	91	5.00	6	SS		Very Dense, Brownish, SAND
6		10.16	10.17	SC			26	63	15cm 40blows	N/100	6.00	7	SS		Very Dense, Brownish, SAND
7		10.29	10.30	SC			No penetration 57	7cm 50blows		N/100	7.50	8	SS		Very Dense, Brownish, SAND
9		10.46	10.47	SC			24	48	59	107	9.00	9	SS		Very Dense, Greyish Brown, SAND
0		11.05	11.06	SC			8	11	13	24	10.50	10	SS		Medium Dense, Greyish, clayey Silty SAND

CS - Core Sample | DS - Disturbed Sample | SUPERVISOR NAME: Baskar. J
SS - Split Spoon Sample | SC - Soil Cutter | SIGNATURE
UDS - Undisturbed Sample | TCB - Tungsten Carbide Bit | DATE: 08-05-2023
WS - Wash Sample | DB - Diamond Bit | CLIENT IN-CHARGE

PROJECT SITE DETAILS
GROUND LEVEL (m)
WATER TABLE (m)
CASING DEPTH (m)

[CHAITANYA FOUNDATION]

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH:03
PAGE No.	2
DIA OF BORE HOLE	150mm / 100mm
BORE START DATE	08-05-2023
BORE END DATE	08-05-2023
TOTAL DRILLING DAYS	1

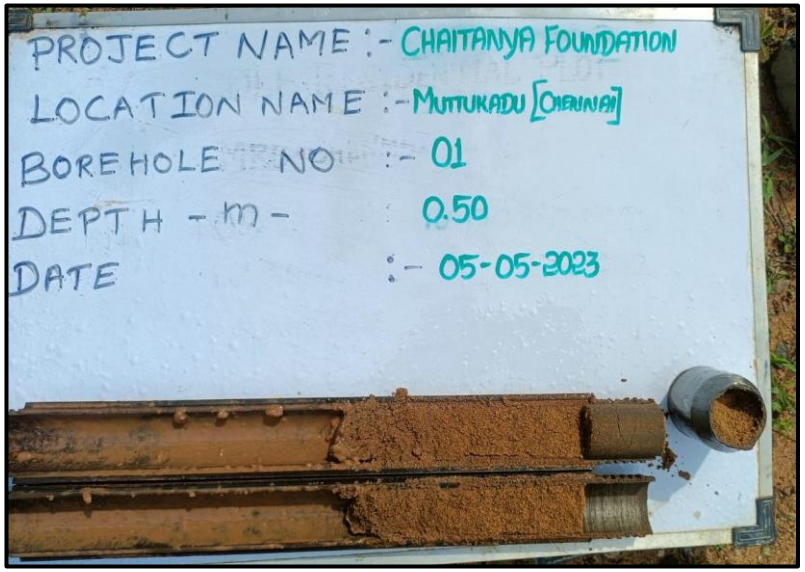
PROJECT NAME	PROPOSED FOR RESIDENCY BUILDING - CHENNAI				
LOCATION	MUTTUKADU	MACHINE No.	HR:01	CHAINAGE (m)	
STRUCTURE	S+5 floors	DRILLING METHOD	Rotary	CO-ORDINATES	N
JOB CODE		FLUSHING MEDIUM	Bentonite		E

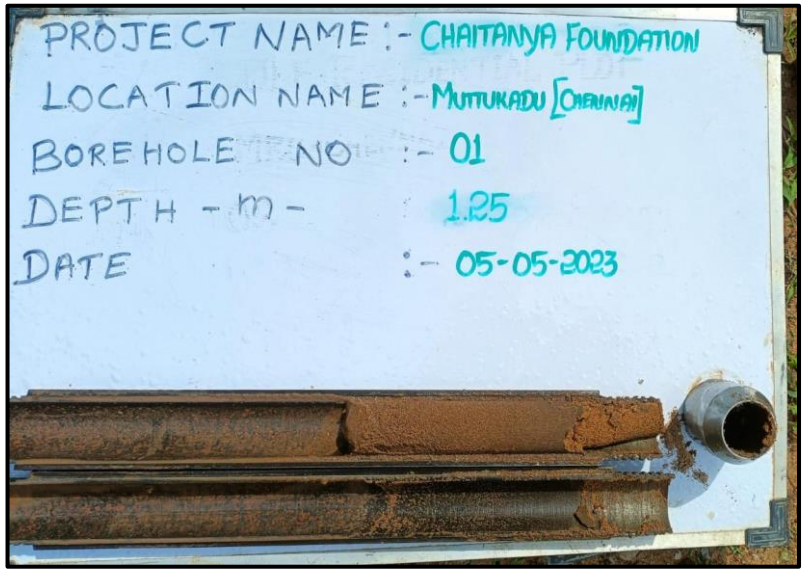
Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	Layer Data: Depth (m)	Geotechnical Description
2		11 23		SC			12	17	21	38	12.00	11	SS		Dense, Grayish, Silty SAND
		11 24													
							Hammer rebound								
4		11.42		SC			37	5cm / 50blls		N/100	14.00	12	SS	13.90	Very Dense to Weak, Whitish Greenish Grey, Silty SOIL with Weathered Rock pieces
		11.43													
							hammer rebound							15.60	
6		12.10		SC			3cm / 15blls			N/100	16.00	13	WS		HIGHLY WEATHERED ROCK
		12.29													

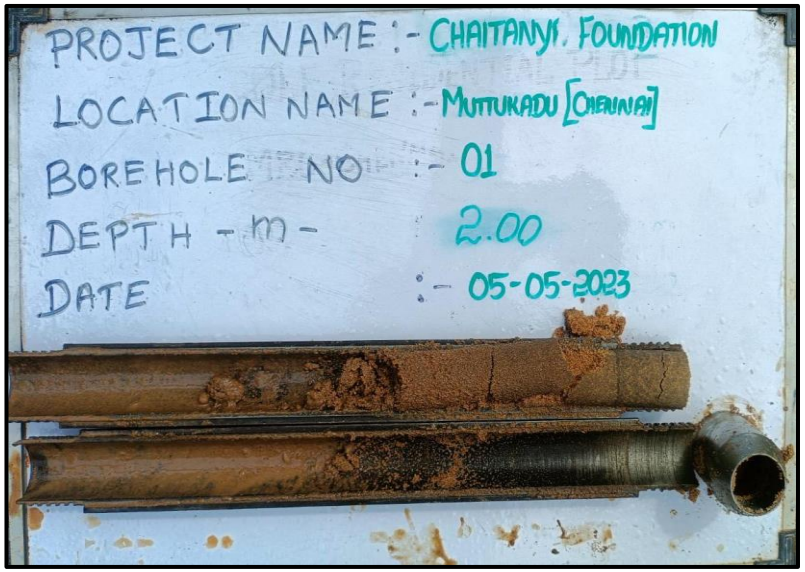
BORE HOLE TERMINATED AT 16.00 mt DEPTH.

CS - Core Sample	DS - Disturbed Sample.	SUPERVISOR NAME	BASKAR. J	PROJECT SITE DETAILS	
SS - Split Spoon Sample	SC - Soil Cutter	SIGNATURE		GROUND LEVEL (m)	
UDS-Undisturbed Sample	TCB - Tungsten Carbide Bit	DATE	08/05/2023	WATER TABLE (m)	
WS - Wash Sample	DB - Diamond Bit	CLIENT IN-CHARGE		CASING DEPTH (m)	

GEO MARINE
THE SPIRIT OF ENGINEERING









GEO MARINE
THE SPIRIT OF ENGINEERING



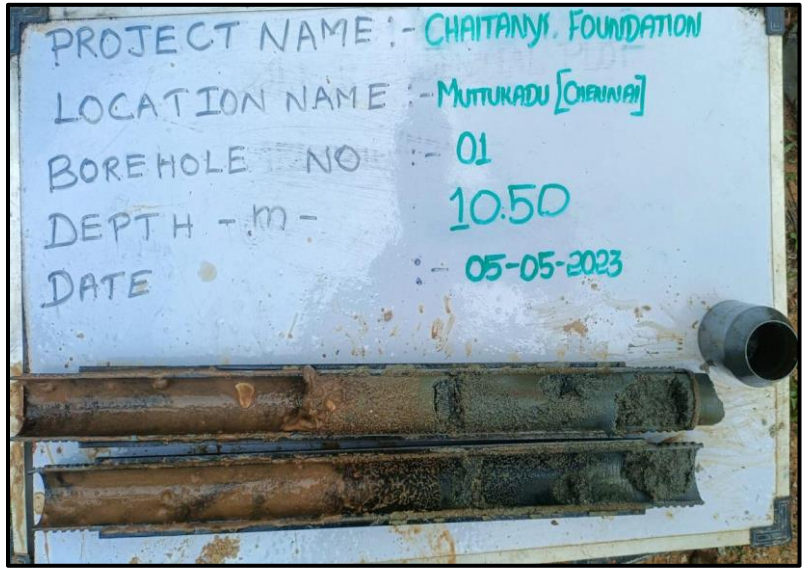






GEO MARINE
THE SPIRIT OF ENGINEERING





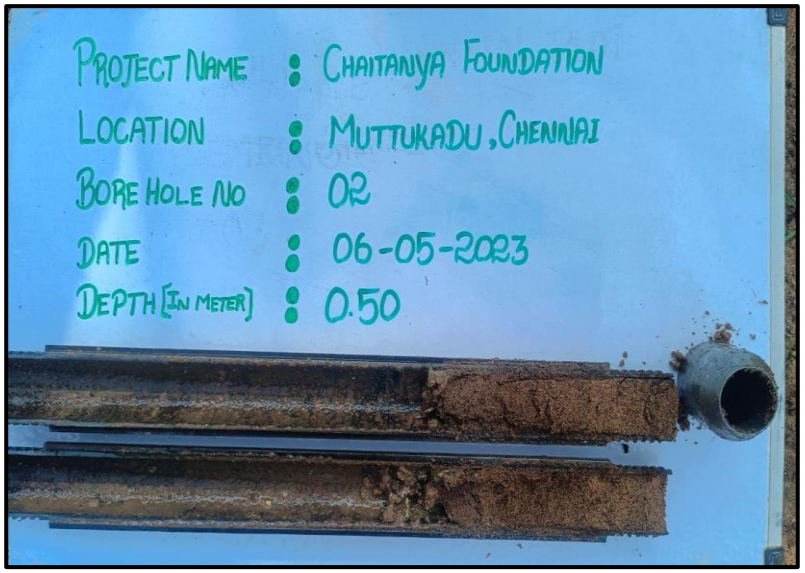




GEO MARINE
THE SPIRIT OF ENGINEERING

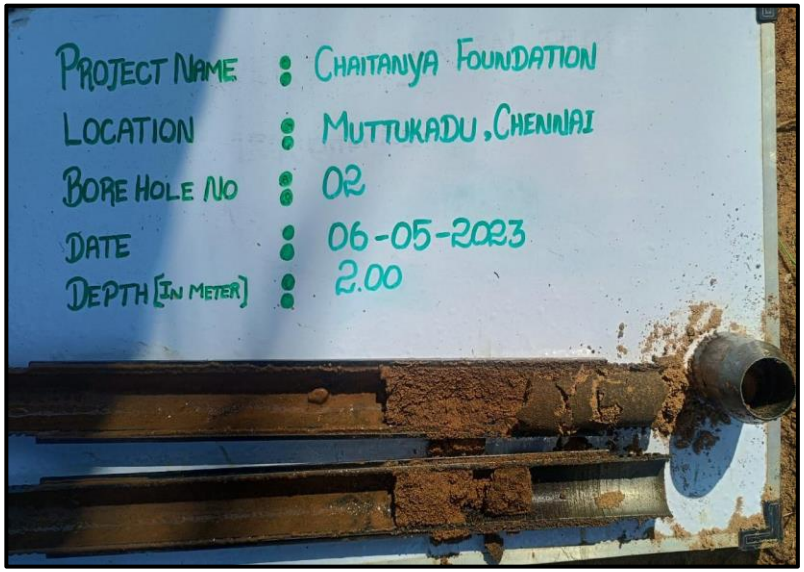


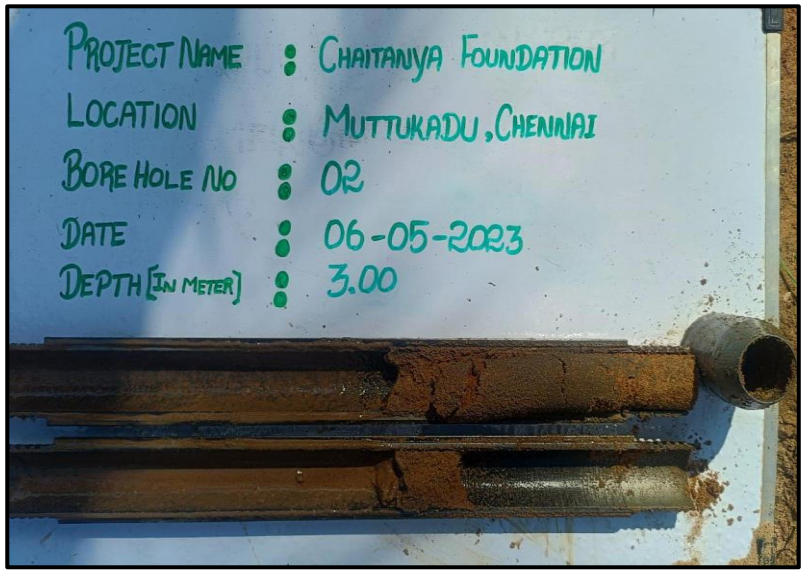


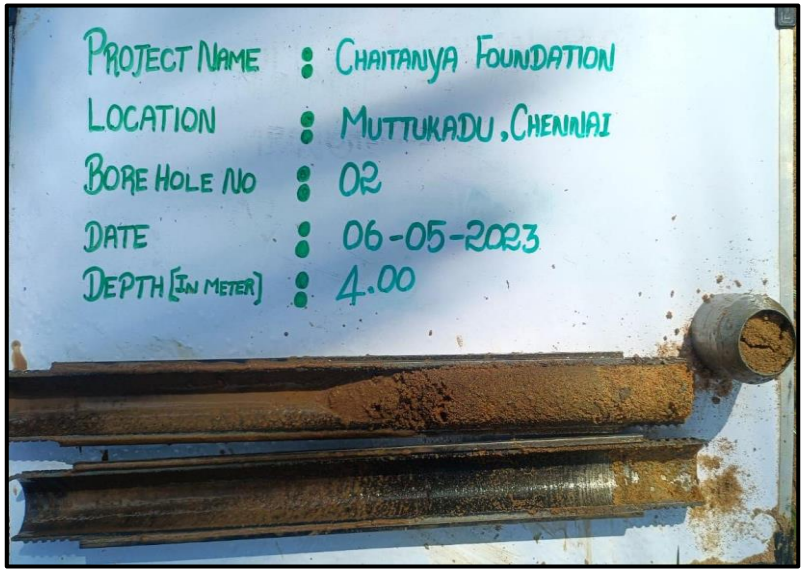


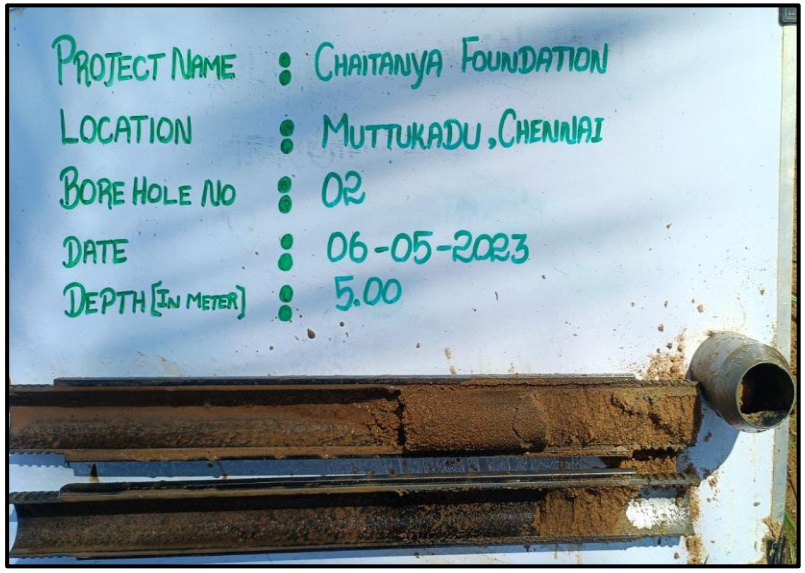


GEO MARINE
THE SPIRIT OF ENGINEERING

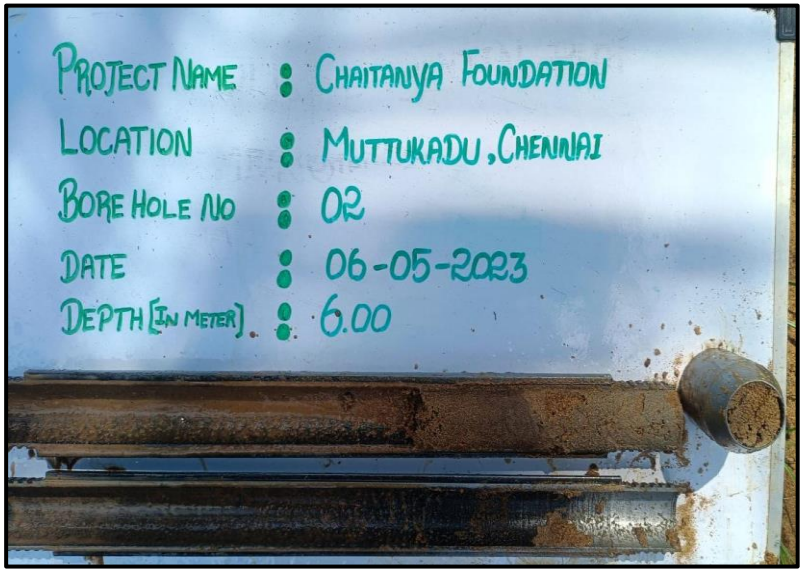


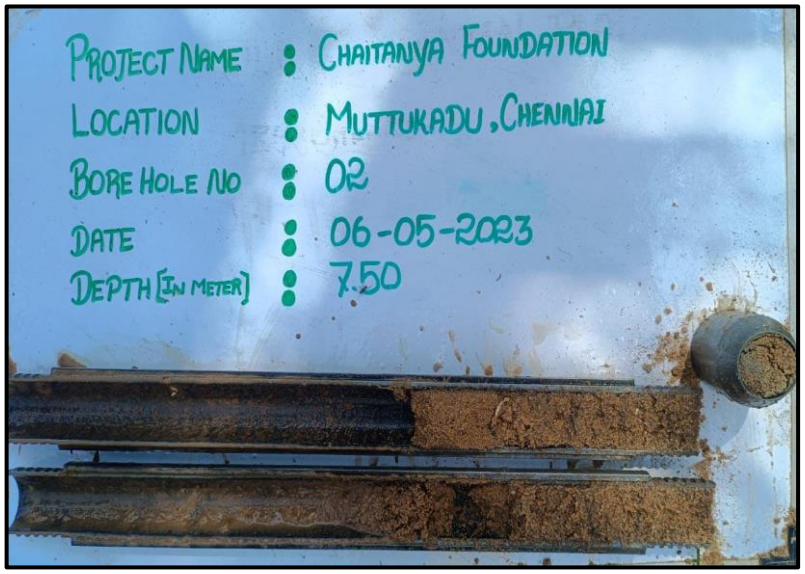


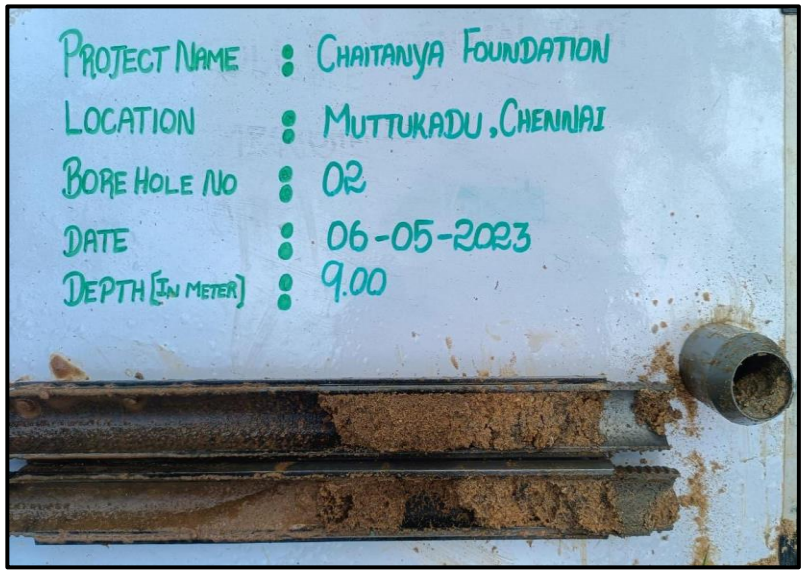


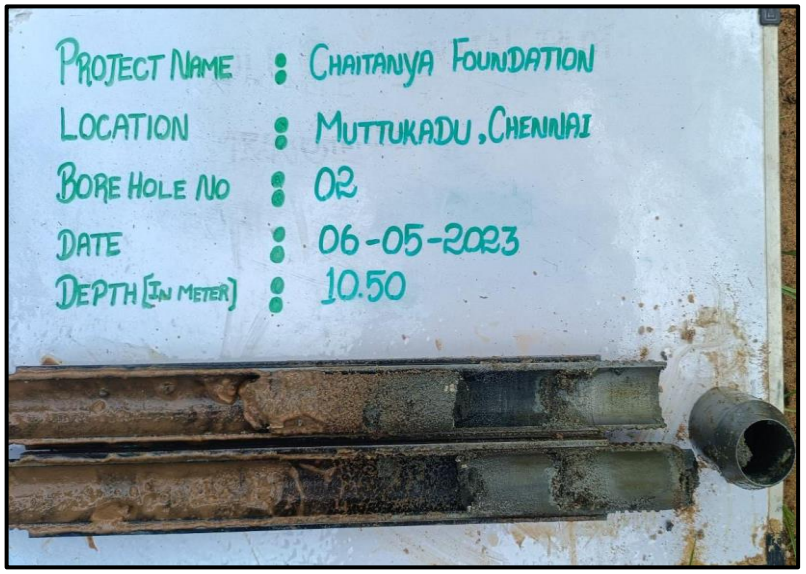


GEO MARINE
THE SPIRIT OF ENGINEERING

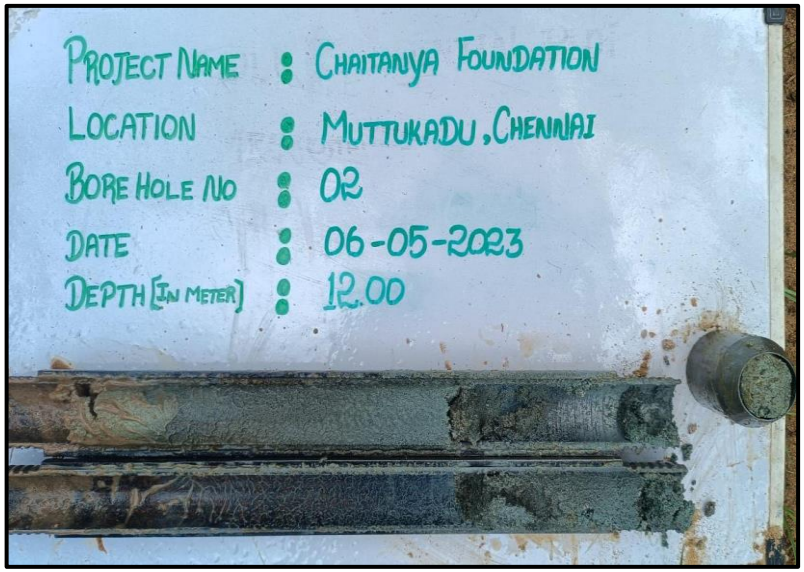


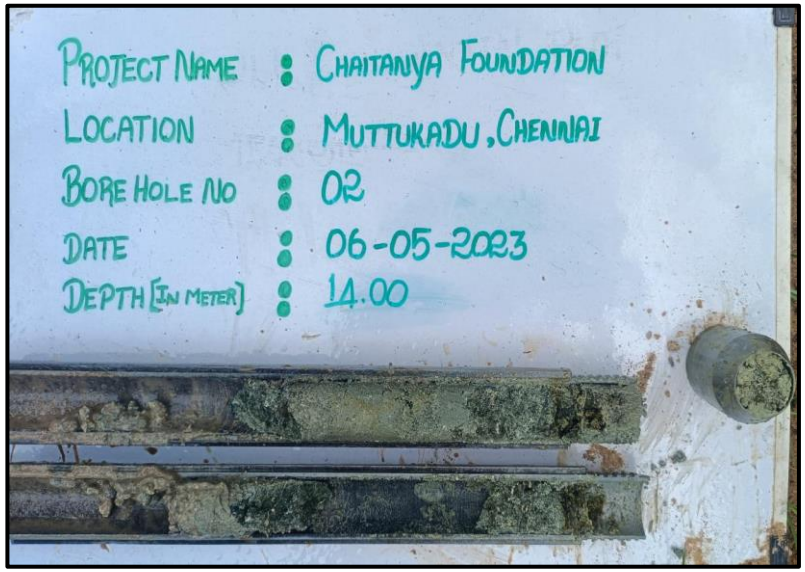


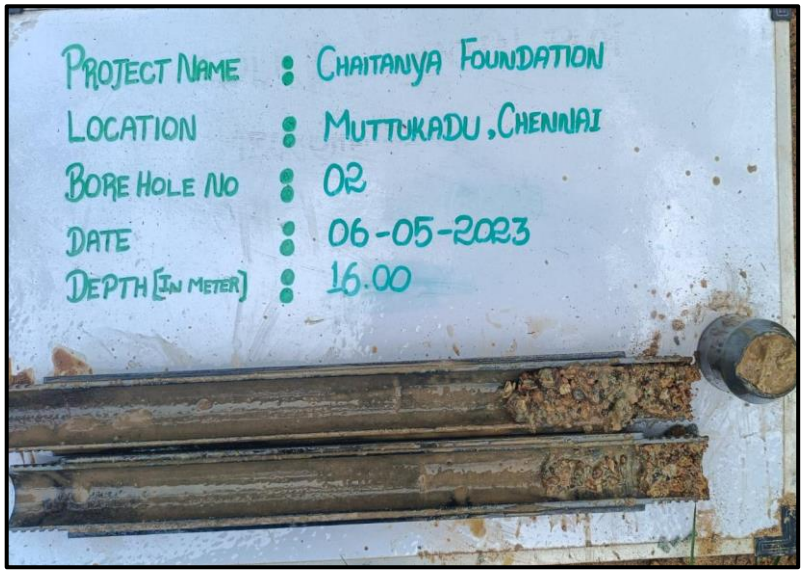




GEO MARINE
THE SPIRIT OF ENGINEERING

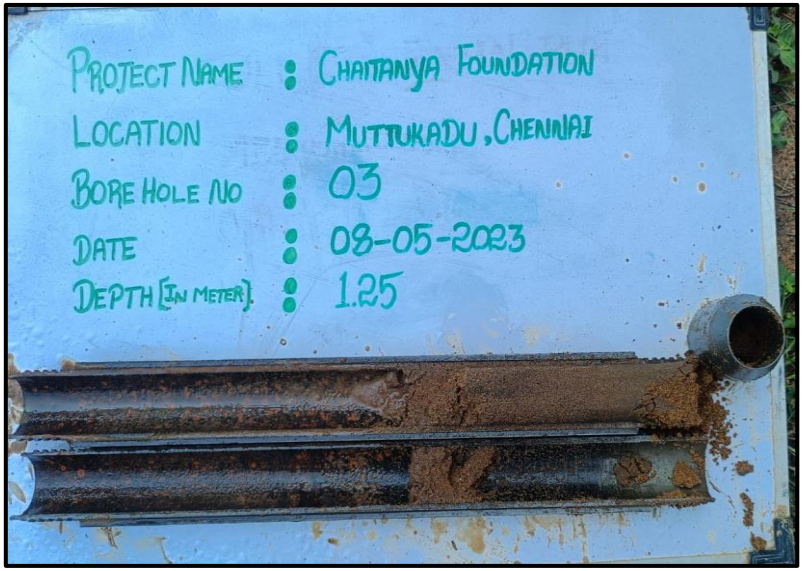








GEO MARINE
THE SPIRIT OF ENGINEERING









GEO MARINE
THE SPIRIT OF ENGINEERING

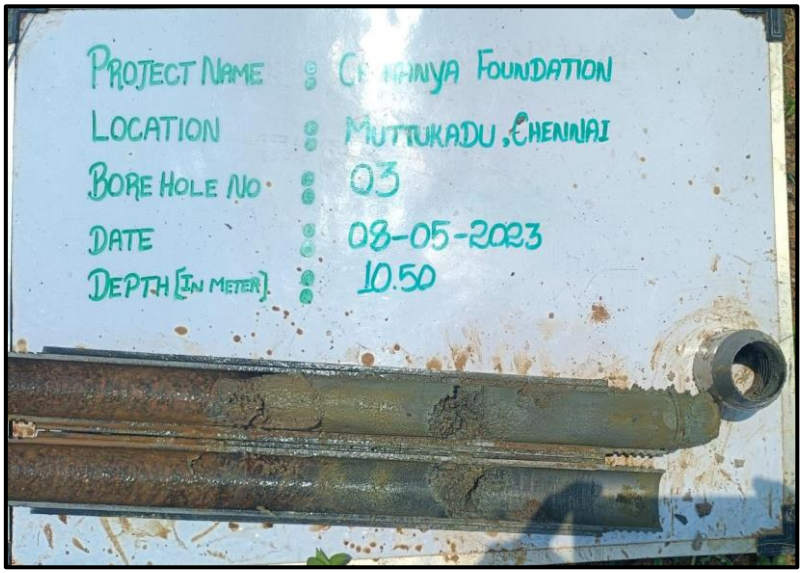








GEO MARINE
THE SPIRIT OF ENGINEERING







GEOMARINE
THE SPIRIT OF ENGINEERING

GEOMARINE
THE SPIRIT OF ENGINEERING

GEOMARINE
THE SPIRIT OF ENGINEERING





GEO MARINE

THE SPIRIT OF ENGINEERING



Dr.C.VENKATA PRASAD
Registered Geotechnical Engineer (RGTE)
Registration No: CGLDIST/RGTE/2020/12/003
District Town and Country Planning Office,
Chengalpattu-603 001. Mob No: +919444026189
Email-drcvp@geomarineindia.com



our services doesn't just end there

Buying & Selling Services

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

Legal & Documentation Services

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

Property Development & Approvals

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

NRI & Investment Services

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

Compliance & Special Services

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



empowering your real estate decisions with smart tools

Property Valuation & Cost Estimation

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

Ownership, Compliance & Legal Verification

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

Zoning & Land Use Analysis

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

Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary

Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management

Verified RealEstate™

We're honored to be part of your real estate journey

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
+91 9996 12 9996
www.verified.realestate