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ASHHIRWAAD ANALYTICAL LABORATORY

(NABL Accredited Laboratory TC – 8619)

(A Unit of Ashhirwaad Associates - Regd. No. 18/2000)

(Approved by Government of India)

Civil Engineering Consultancy Services

- ❖ Geotechnical Investigation
- ❖ Survey and contouring
- ❖ Load testing on Piles
- ❖ Structural consultancy
- ❖ Material testing
- ❖ NDT Services

"A Total Solution Provider In Civil Engineering Services"

NABL - TC - 8619

Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

GEOTECHNICAL INVESTIGATION REPORT

PROJECT : **GEO TECHNICAL INVESTIGATION FOR THE PROPOSED CONSTRUCTION OF APARTMENT BUIDLING STILT +5 AT PLOT Residential building with 83 dwelling units and GYM for Affordable Housing at Plot No.MSB-12, New Vision Township, Vengambakkam, Chennai 600127, comprised in New S.No.100/1A1A1 (Pt), 100/1B1A2 (Pt), 100/3B1A1 (Pt), 101/3A (Pt),101/3B1B (Pt), 101/2B2 (Pt), 102/4A (Pt), 102/5B2 (Pt), 102/5C3 (Pt) & 102/5D3 (Pt) of Vengambakkam Village within the limit of St.Thomas Mount Panchayat Union –**

PROJECT NO : **AAL.1968/VENGAMBAKKAM /TN/21-22**

CLIENT : **M\S. VEDESH REALTORS PRIVATE LIMITED TAMILNADU.**

ENGINEER : **M\S. ARISON CONSULTANCY LLP CHENNAI, TAMILNADU-600028. CONTACT NO: 9943907091.**

For ASHHIRWAAD ANALYTICAL LABORATORY

Authorised Signatory

DATE OF FIELD INVESTIGATION : **18.11.2021-20.11.2021**

DATE OF RECEIPT OF SAMPLE : **24.10.2021**

DATE OF REPORT : **30.11.2021**

Head Office: **"Mayan Vihar"** No.182, 2nd Floor, 4th Main Road, Mahaveer Nagar, Karuvadikuppam, Puducherry-605008 Phone: 0413-2252663 Extn.27 & 31 Cell: 7598491505

Branch Office: No. 14/57C, Nerkundram Road, Vadapalani,Chennai – 26. Cell: 9629486505

E.mail: aageotech@gmail.com, Website: www.ashhirwaadassociates.co.in

Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

NAME OF WORK: **GEO TECHNICAL INVESTIGATION FOR THE PROPOSED CONSTRUCTION OF APARTMENT BUIDLING STILT +5 AT PLOT Residential building with 83 dwelling units and GYM for Affordable Housing at Plot No.MSB-12, New Vision Township, Vengambakkam, Chennai 600127, comprised in New S.No.100/1A1A1 (Pt), 100/1B1A2 (Pt), 100/3B1A1 (Pt), 101/3A (Pt),101/3B1B (Pt), 101/2B2 (Pt), 102/4A (Pt), 102/5B2 (Pt), 102/5C3 (Pt) & 102/5D3 (Pt) of Vengambakkam Village within the limit of St.Thomas Mount Panchayat Union –**

1. INTRODUCTION
   - FLOW CHART
2. SCOPE OF WORK
3. FIELD INVESTIGATION
   - GENERAL
   - STANDARD PENETRATION TEST (IS: 2131 - 1981)
   - IS CODE FOR FIELD INVESTIGATION
   - SITE EXPLORATION
   - SITE & BORE LOG DETAILS
4. APPENDICES
5. SITE PHOTOS
6. SITE LAYOUT WITH BORE LOG LOCATIONS
7. LABORATORY TEST RESULTS
   - BORE LOG WITH RESULT
   - DRY SIEVE CHART
8. RECOMMENDATION

For ASHHIRWAAD ANALYTICAL LABORATORY

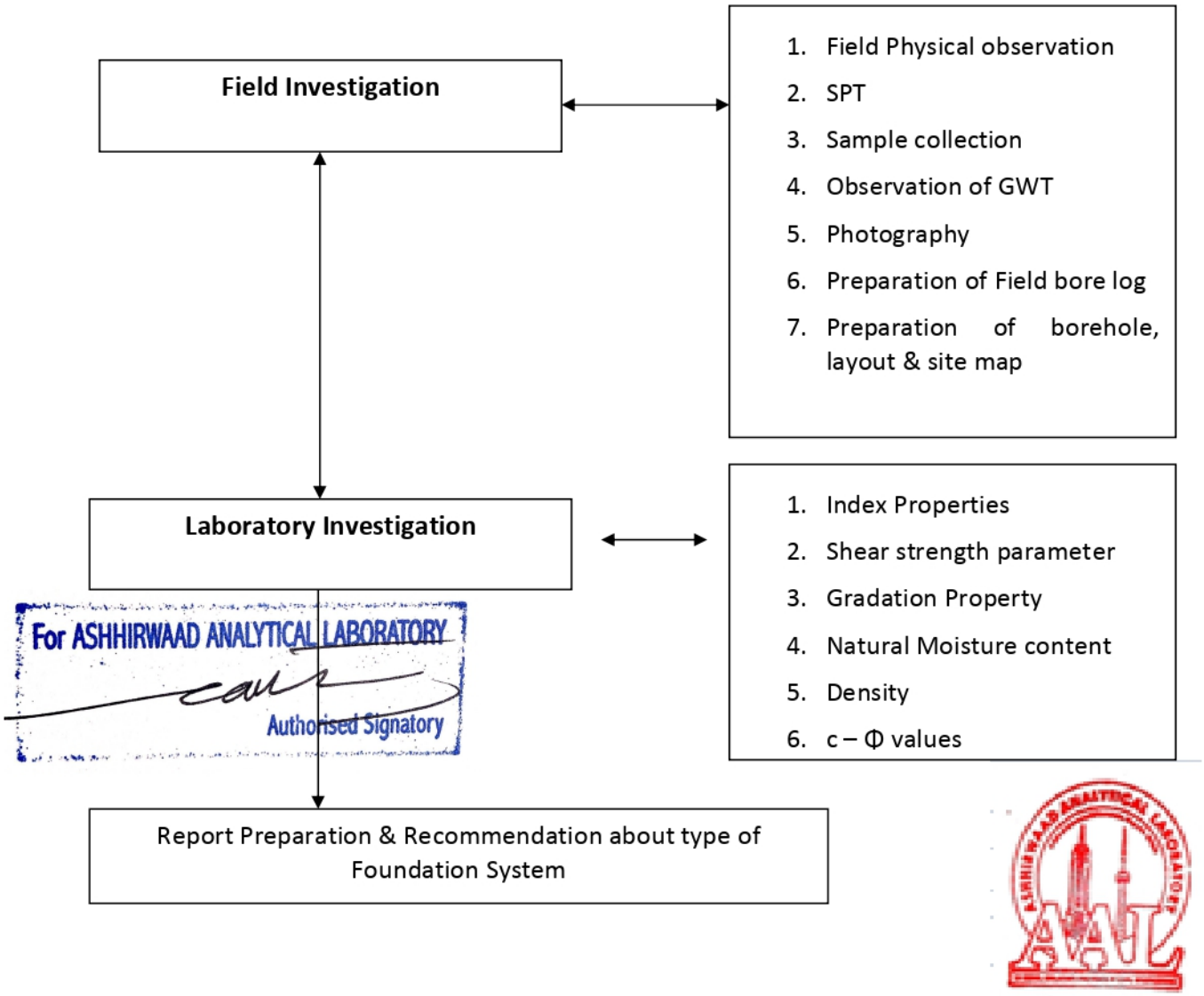
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Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

1. INTRODUCTION

A Geotechnical investigation for the above said work was undertaken as per the authorization given by **M\S. VEDESH REALTORS PRIVATE LIMITED,**Tamil Nadu.

FLOW CHART



Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

2. SCOPE OF WORK

2.1 This geotechnical investigation has been carried out to ascertain the safe bearing capacity and to decide upon suitable foundation system for the proposed structure. It was instructed to make Four number of bore holes. The BH -1 was driven upto 7.0m and BH-2 was driven up to 5.0m depth BH-3 was driven up to 6.0m depth and BH-4 was driven up to 4.0m depth and terminated after encountering very dense condition of soil with atleast 3 successive SPT's of "N" values are 50 or rebound occurs because of rock formation.

2.2 The allowable safe bearing capacity of the soil is calculated based on the field geotechnical investigation, soil properties, GWT and subsequent laboratory experiments.

3. FIELD INVESTIGATION

3.1 GENERAL

Mobilizations of equipment, skilled and unskilled labours are arranged at site. The various factors for the number and position of boreholes and spacing of boreholes are based on the extent of the site, nature and type of structure. Depth of borehole is concluded based on condition of soil, penetration capacity of soil, shear failure and hard strata condition. Standard Penetration Test (SPT) is conducted at various depths. The disturbed soil sample is collected from the site and transported for examination to Ashhirwaad Analytical Laboratory. The field investigation is being monitored by experienced civil engineers/ Geotechnical/ Structural Engineer.

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3.2 STANDARD PENETRATION TEST (IS: 2131 – 1981)

Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

EQUIPMENT PREPARATION

3.2.1 DRILLING EQUIPMENT

The equipment used shall provide a clean borehole 100 to 150 mm in diameter, for insertion of the sampler ensure that the penetration test is performed on undisturbed soil and shall permit driving of the split spoon sampler to obtain penetration record and sample in accordance with procedure.

3.2.2 DRIVE WEIGHT ASSEMBLY

The drive weight assembly shall consist of driving head and a 63.5 kg weight with 75cm free fall. It is ensured that the energy of the falling weight is not reduced by friction between the drive weight and the guides. The rods to which the sampler is attached for driving should be straight, tightly coupled and straight in alignment. For driving the casting, a hammer heavier than 63.5 kg may be used.

3.2.3 CLEANING THE BOREHOLE

In case wash boring is adopted for cleaning the borehole, side discharge bits are permissible, but in no case a bottom discharge bit be permitted. In cohesive soils, the borehole may be cleaned with bailer with a flap valve.

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3.2.4 OBTAINING THE SAMPLES

Test shall be made at every change in stratum or at intervals of not more than 1.5 m whichever is less. Tests may be made at lesser or greater intervals if specified or considered necessary.

The sampler shall be lowered to the bottom of the borehole. The following information shall be noted and recorded.

(a) Depth of bottom of borehole below ground level.

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(b) Penetration of the sampler into the soil under the combined weight of sampler and rods

(c) Water level in the borehole or casting

(d) Depth of bottom of casting below ground level.

Labels shall be fixed to the jar or notation shall be written on the covers with the following information:

a) Origin of sample
b) Job designation
c) Boring number
d) Sample number
e) Depth of sampling
f) Penetration record
g) Length of recovery
h) Date of sampling

The jars containing samples shall be stored in suitable container for shipment. Samples should not be placed in the sun.

3.3 IS CODE FOR FIELD INVESTIGATION

SL.NO	IS CODE NUMBER	IS CODE NAME
1	IS : 1498 – 1970 (Reaffirmed 2007)	Classification & Identification of soil for general engineering purpose (First Revision)
2	IS : 1892 – 1979 (Reaffirmed 2002)	Code of practice for sub surface investigation for foundation (First Revision)
3	IS : 2131 – 1981 (Reaffirmed 2002)	Method of Standard Penetration Test for soil (First Revision)
4	IS : 2132 – 1986 (Reaffirmed 2002)	Code of practice for thin walled tube sampling of soil (Second Revision)
5	IS : 4968 – 1976 (Reaffirmed 2007)	Method of sub surface sounding of soil : Static cone penetration (First Revision)

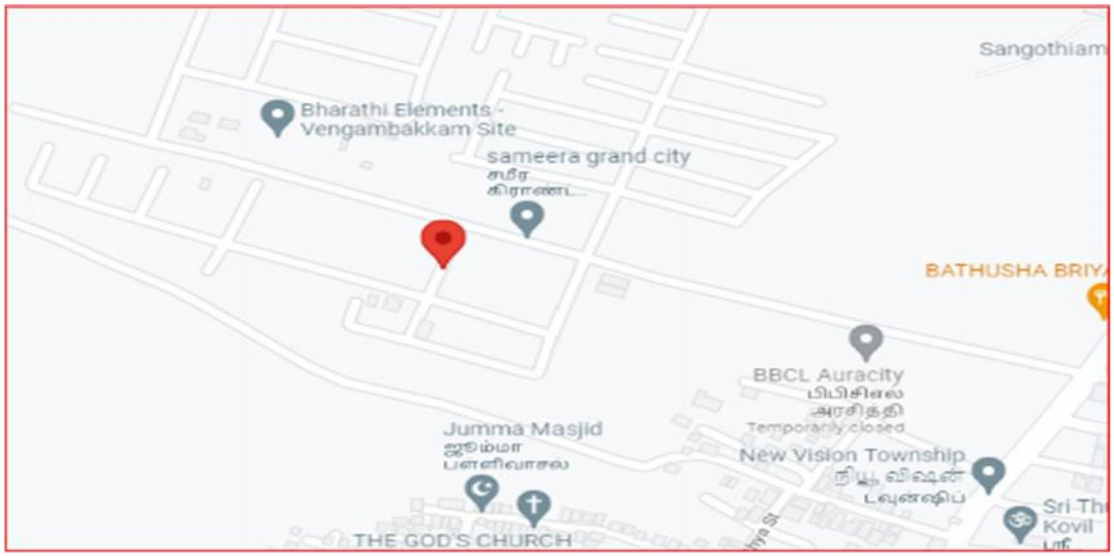
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Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

3.4 SITE EXPLORATION

Subsurface exploration should be carried out in preliminary and detailed exploration. Shear strength and compressibility of the soil is determined in the detailed exploration. The method of boring for soil exploration is rotary boring. Rotary boring is effected by cutting action of the soil. The bit is carried at the end of hollow, jointed drill rods which is rotated by the chuck. A mud laden fluid is pumped continuously and fluid returns to surface in angular space. Undisturbed samples are collected at suitable intervals.

3.5 SITE MAP



Bore Hole No	LATITUDE	LONGITUDE
BH-1	12°52'15.83"N	80°7'37.77"E
BH-2	12°52'16.1"N	80°7'37.18"E
BH-3	12°52'15.6"N	80°7'40.34"E
BH-4	12°52'16.35"N	80°7'38.09"E

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3.6 BOREHOLE DETAILS

Four number of bore holes are driven in the field at the location of the site. As per IS: 1892 - 1979 (Reaffirmed 2002), the various driven depth of the borehole, Ground Water Table and their corresponding identifications are tabulated below.

SL.NO	BOREHOLE IDENTIFICATION NUMBER	DRIVEN BOREHOLE DEPTH (m)
1.	BH-1	7.0
2.	BH-2	5.0
3.	BH-3	6.0
4.	BH-4	4.0

BOREHOLE IDENTIFICATION NUMBER	GROUND WATER TABLE (m)
BH-1	6.0
BH-2	6.0
BH-3	6.0
BH-4	6.0

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3.7 LIST OF IS CODE

3.7.1 LABORATORY IS CODE

SL.NO	IS CODE NUMBER	IS CODE NAME
1	IS : 2720 – 1983 (Part – 1) (Reaffirmed 2006)	Methods of test for soil :Preparation of dry soil sample for various test (Second Revision)

Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

2	IS 2720 – 1980 (Part – 2) (Reaffirmed 2010)	Methods of test for soil : Determination of water content (Second Revision)
3	IS 2720 – 1980 (Part – 3) (SECTION – 1) (Reaffirmed 2002)	Methods of test for soil : Determination of specific gravity : Fine grained soil (First Revision)
4	IS 2720 – 1980 (Part – 3) (SECTION – 2) (Reaffirmed 2002)	Methods of test for soil : Determination of specific gravity : Fine, Medium, Coarse grained soil (First Revision)
5	IS 2720 – 1985 (Part – 4) (Reaffirmed 2006)	Methods of test for soil : Grain size analysis(Second Revision)
6	IS 2720 – 1985 (Part – 5) (Reaffirmed 2006)	Methods of test for soil : Determination of liquid and plastic limit (Second Revision)
7	IS 2720 – 1985 (Part – 15) (Reaffirmed 2006)	Methods of test for soil : Determination of consolidation properties (First Revision)
8	IS 1809 – 1972 (Reaffirmed 2006)	Methods of test for soil : Glossary of terms & symbols relating to soil engineering (Third Revision)

3.7.2 FOUNDATION IS CODE

SL.NO	IS CODE NUMBER	IS CODE NAME
1	IS : 1080 – 1986 (Reaffirmed 2002)	Code of practice for design and construction of shallow foundation on soil (other than raft, ring and shell) (Second Revision)
2	IS 1904 : 1968 (Reaffirmed 2006)	Code of practice for design and construction of foundation on soil :General requirement (Third Revision)
3	IS 6403 – 1981 (Reaffirmed 2002)	Code of practice for determination of bearing capacity of shallow foundation (First Revision)

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3.7.3SEISMIC IS CODE

SL.NO	IS CODE NUMBER	IS CODE NAME
1	IS 1893 – 2002 (Reaffirmed 2007)	Criteria for Earthquake Resistant design of Structures(Fifth Revision)

Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

4.APPENDICES

SAFE BEARING CAPACITY CALCULATIONS:

4.1 For Shallow foundation it is as per **IS: 1904 – 1995,** Code of practice for design and construction of foundations: General requirements (third revision). The recommended safe bearing Capacity of soil for shallow foundation was calculated as per IS: **6403- 1981**, Code of practice for Determination of Bearing Capacity of Shallow Foundation. The settlement calculations are as per **IS: 8009 (Part-I) - 1976**, *Code of practice for calculation of settlements in foundations, part I Shallow foundation subjected to symmetrical static vertical Loads.* All the calculations are carried out based on the SPT value observed from the field.

4.2 FOR SHALLOW FOUNDATION:

IN CASE OF GENERAL SHEARE FAILURE AS PER IS: 6403: 1981

The Ultimate Net Bearing Capacity $q_d = cN_c s_c d_c i_c + q(N_q -) s_q d_q i_q + 0.5\, B\gamma N_\gamma s_\gamma d_\gamma i_\gamma W'$

Safe Load Carrying Capacity = q_d/F.S

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DEPTH FACTOR

$d_c = 1 + (0.2\, D_f / B\sqrt{N\emptyset})$

$d_q = d_\gamma = 1$ for $\emptyset < 10^o$

$d_q = d_\gamma = 1 + 0.1\, D_f / B\sqrt{N\emptyset}$ for $\emptyset > 10^o$

INCLINATION FACTOR

$i_c = i_q = (1 - \alpha / 90)^2$

$i_\gamma = (1 - \alpha / \emptyset)^2$

Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

SHAPE FACTOR

Sl. No.	Shape of Base	s_c	s_q	s_γ
i)	Continuous strip	1.00	1.00	1.00
ii)	Rectangle	1 + 0.2 B/L	1 + 0.2 B/L	1 – 0.4 B/L
iii)	Square	1.3	1.2	0.8
iv)	Circle	1.3	1.2	0.6

Where,

c	= Cohesion in Kg/cm
D_f	= Depth of foundation in cm
d_c, d_q, $d\gamma$	= Depth factors
i_c, i_q, $i\gamma$	= Inclination factors
L	= Length of footing in cm
L'	= Effective length of footing in cm
N	= Corrected standard penetration value
N_c, N_q, $N\gamma$	= Bearing capacity factors
$N_\emptyset$	= $\tan^2(\pi/4 + \emptyset/2)$
q	= Effective surcharge at the base level of Foundation
Qd	= Net ultimate bearing capacity based on general shear failure
W'	= Correction factor for location of water table
α	= Inclination of the load to the vertical in degrees
$\emptyset$	= Angle of shearing resistance of soil in degrees
γ	= Bulk unit weight of foundation soil
F.S	= Factor of safety

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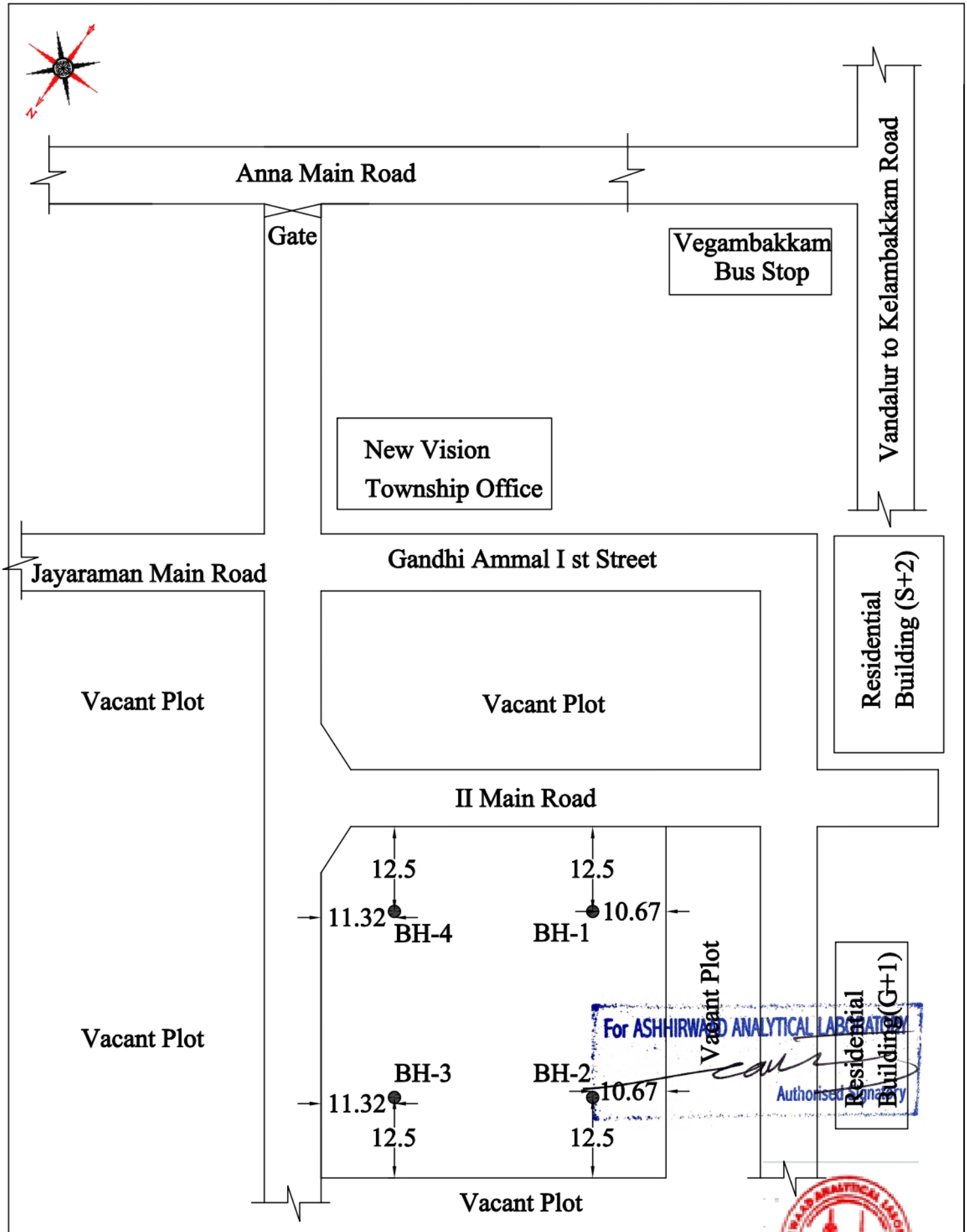


Fig. 1 – Site Photo Showing the Soil Exploration Work.

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Borehole Layout



Note: This Drawing is Not to Scale.

All Dimensions are in Meter

Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

LABORATORY TEST RESULTS

Name Of The Work : Geotechnical Investigation For The Proposed Construction Of Appartment Building(S+5) at Plot No:MSB-12,New Vision Township,Anna Mian Road,St.Thomas Mount Panchayat,Vengambakkam,Chennai,Tamil Nadu-600048.

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ASHHIRWAAD ANALYTICAL LABORATORY, PUDUCHERRY

(NABL Accredited Laboratory - TC-8619)

NABL - TC - 8619
ISO/IEC 17025:2005

ULR : TC861921000000506F

BORE LOG - 1/4

Project No:	AAL.1968/TN/2021	Date:	18.11.2021	Location:	Vengambakkam,Chennai
BH. No :	1	GWT (m):	6.0m	Lat:12°52'15.83"N	Long:80°7'37.77"E
Depth of boring (m) :		7.0m			

Depth Below GL	Soil stratum	Classification of soil	Thickness of Layer (m)	Depth of Sampling(m) UDS	Depth of Sampling(m) DS	Graphical Representation of Standard Penetration Test Data (N)	N Value	Description /consistency	Natural moisture content (%)	Density (γ) t/m³	Index properties (%) Liquid limit (W_L)	Plastic limit (W_P)	Plasticity index(I_P)	Consistency index (I_C)	Free swell index(Cs)	Shear strength parameters Direct shear test C(kg/cm²)	Φ (degrees)	Gradation properties (%) Sieve analysis Gravel	Coarse sand	Medium sand	Fine sand	silt & clay
		Fill up Earth	2.20		0.5																	
1.0					1.0																	
		Sandy Gravel	0.30		1.5		50 (17cm↓)	Very Dense	15	1.79		Non-Plastic			Nil	0.030	31°32'	27.32	14.21	24.59	15.85	18.03
2.0					2.0		50 (13cm↓) Rebound	Very Dense	14	1.81		Non-Plastic			Nil	0.012	32°11'	50.63	17.72	15.19	10.13	6.33
				▲	2.5																	
3.0					3.0		50 (8cm↓) Rebound	Very Dense	8	1.90		Non-Plastic			Nil	0.006	34°8'	84.64	13.57	1.79	0.00	0.00
				▲	3.5																	
4.0		Gravel (GP)	2.50		4.0		50 (5cm↓) Rebound	Very Dense														
				▲	4.5																	
5.0					5.0		Rebound	Very Dense														
				▲	5.5																	
6.0		Soft Rock	2.00		6.0		Rebound	Very Dense														
				▲	6.5																	
7.0				▲	7.0		Rebound	V.Dense														

For ASHHIRWAAD ANALYTICAL LABORATORY

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Legend:

SP Poorly graded sand
SW Well graded sand
SM-SW- Silty sand
SC- Clayey sand
GW- Well graded gravel
GP- Poorly graded gravel
ML- Silt or clayey silt
CL- Silty clay
MI- Clayey silt
CI - Sandy clay
CH- High Plasticity clay
UDS - Undisturbed sample
Rebound
* Self Pentration
CRR- Core Recovery Ratio (for Rock)

Logged by
Junior Engineer

Checked by
General Manager

Name Of The Work : Geotechnical Investigation For The Proposed Construction Of Appartment Building(S+5) at Plot No:MSB-12,New Vision Township,Anna Mian Road,St.Thomas Mount Panchayat,Vengambakkam,Chennai,Tamil Nadu-600048.

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ULR : TC861921000000506F

BORE LOG - 2/4

Project No:	AAL.1968/TN/2021	Date:	20.11.2021	Location:	Vengambakkam,Chennai
BH. No :	2	GWT (m):	Not Encountered	Lat:12°52'16.1"N	Long:80°7'37.18"E
Depth of boring (m) :		5.0m			

Depth Below GL	Soil stratum	Classification of soil	Thickness of Layer (m)	Depth of Sampling(m) UDS	Depth of Sampling(m) DS	Graphical Representation of Standard Penetration Test Data (N) N Value	10 20 30 40 50	Description /consistency	Natural moisture content (%)	Density(γ) t/m³	Index properties (%) Liquid limit (W_L)	Plastic limit (W_P)	Plasticity index(I_P)	Consistency index (I_C)	Free swell index(Cs)	Shear strength parameters Direct shear test C (kg/cm²)	Φ (degrees)	Gradation properties (%) Sieve analysis Gravel	Coarse sand	Medium sand	Fine sand	silt & clay
					0.5																	
1.0		Silty Sand	1.00		1.0																	
					1.5	10		Loose	20	1.81		Non-Plastic			Nil	0.054	30°45'	27.55	5.51	17.08	14.88	34.99
2.0		Gravelly Sand	1.10		2.0	$50_{(5cm↓)}$																
					2.5	Rebound		Very Dense	16	1.87		Non-Plastic			Nil	0.011	32°18'	78.26	14.23	7.11	0.00	0.40
3.0					3.0	$50_{(6cm↓)}$																
					3.5	Rebound		Very Dense	7	1.93		Non-Plastic			Nil	0.008	34°3'	74.66	18.49	6.85	0.00	0.00
4.0		Gravel	2.90		4.0																	
					4.5	$50_{(3cm↓)}$		Very Dense														
5.0					5.0	Rebound		V.Dense														
		Rock																				

For ASHHIRWAAD ANALYTICAL LABORATORY

Authorised Signatory

Legend:

SP Poorly graded sand
SW Well graded sand
SM-SW- Silty sand
SC- Clayey sand
GW- Well graded gravel
GP- Poorly graded gravel
ML- Silt or clayey silt
CL- Silty clay
MI- Clayey silt
CI - Sandy clay
CH- High Plasticity clay
UDS - Undisturbed sample
Rebound
* Self Pentration
CRR- Core Recovery Ratio (for Rock)

Logged by
Junior Engineer

Checked by
General Manager

Name Of The Work : Geotechnical Investigation For The Proposed Construction Of Appartment Building(S+5) at Plot No:MSB-12,New Vision Township,Anna Mian Road,St.Thomas Mount Panchayat,Vengambakkam,Chennai,Tamil Nadu-600048.

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ASHHIRWAAD ANALYTICAL LABORATORY, PUDUCHERRY
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ULR : TC861921000000506F **BORE LOG - 3/4**

Project No:	AAL.1968/TN/2021	Date:	20.11.2021	Location:	Vengambakkam,Chennai
BH. No :	3	GWT (m):	6.0m		Lat:12°52'15.56"N Long:80°7'40.34"E
Depth of boring (m) :		6.0m		Graphical Representation of Standard Penetration Test Data (N)	

Depth Below GL	Soil stratum	Classification of soil	Thickness of Layer (m)	Depth of Sampling(m) UDS	Depth of Sampling(m) DS	N Value	10 20 30 40 50	Description /consistency	Natural moisture content (%)	Density (γ) t/m³	Liquid limit (W_L)	Plastic limit (W_P)	Plasticity index(I_P)	Consistency index (I_C)	Free swell index(Cs)	Direct shear test C (kg/cm²)	Direct shear test Φ (degrees)	Sieve analysis Gravel	Coarse sand	Medium sand	Fine sand	silt & clay
					0.5																	
1.0		Silty Sand	1.00		1.0																	
					1.5	$50_{(12cm\downarrow)}$		Very Dense	18	1.86		Non-Plastic			Nil	0.035	31°32'	43.66	7.58	16.59	8.53	23.70
2.0		Sandy Gravel	1.30		2.0	$50_{(5cm\downarrow)}$		Very Dense														
					2.5	Rebound			8	1.91		Non-Plastic			Nil	0.016	32°45'	67.74	17.97	9.68	1.84	2.76
3.0					3.0	$50_{(6cm\downarrow)}$		Very Dense														
					3.5	Rebound			8	1.93		Non-Plastic			Nil	0.008	34°16'	62.68	19.37	15.67	1.42	0.85
4.0		Gravel (GP)	3.70		4.0	$50_{(3cm\downarrow)}$		Very Dense														
					4.5	Rebound																
5.0					5.0	$50_{(3cm\downarrow)}$		Very Dense														
					5.5	Rebound																
6.0					6.0	Rebound		V.Dense														
		Rock																				

Legend:

SP Poorly graded sand	GW- Well graded gravel	MI- Clayey silt	Rebound	Logged by
SW Well graded sand	GP- Poorly graded gravel	CI - Sandy clay	* Self Pentration	Junior Engineer
SM-SW- Silty sand	ML- Silt or clayey silt	CH- High Plasticity clay	UDS - Undisturbed sample	CRR- Core Recovery Ratio (for Rock)
SC- Clayey sand	CL- Silty clay			Checked by
				General Manager

For ASHHIRWAAD ANALYTICAL LABORATORY
Authorised Signatory

Name Of The Work : Geotechnical Investigation For The Proposed Construction Of Appartment Building(S+5) at Plot No:MSB-12,New Vision Township,Anna Mian Road,St.Thomas Mount Panchayat,Vengambakkam,Chennai,Tamil Nadu-600048.

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NABL - TC - 8619
ISO/IEC 17025:2005

ULR : TC861921000000506F **BORE LOG - 4/4**

Project No:	AAL.1968/TN/2021	Date:	20.11.2021	Location:	Vengambakkam,Chennai
BH. No :	4	GWT (m):	6.0m	Lat:12°52'16.35"N Long:80°7'38.09"E	
Depth of boring (m) :		4.0m		Graphical Representation of Standard Penetration Test Data (N)	

Depth Below GL	Soil stratum	Classification of soil	Thickness of Layer (m)	Depth of Sampling(m) UDS	Depth of Sampling(m) DS	N Value	10 20 30 40 50	Description/consistency	Natural moisture content (%)	Density (γ) t/m³	Liquid limit (W_L)	Plastic limit (W_P)	Plasticity index(I_P)	Consistency index (I_C)	Free swell index(Cs)	Direct shear test C (kg/cm²)	Direct shear test Φ (degrees)	Sieve analysis Gravel	Coarse sand	Medium sand	Fine sand	silt & clay
					0.5																	
1.0		Silty Sand	1.30		1.0	50(5cm↓)		Very Dense														
					1.5	Rebound			11	1.84		Non-Plastic			Nil	0.024	32°14'	29.83	32.77	26.89	6.72	3.78
2.0					2.0	50(3cm↓)		Very Dense														
		Gravel (GP)	2.70		2.5	Rebound			11	1.87		Non-Plastic			Nil	0.045	33°45'	27.06	38.28	32.67	1.32	0.66
3.0					3.0	50(2cm↓)		Very Dense														
					3.5	Rebound			9	1.92		Non-Plastic			Nil	0.006	34°8'	57.68	23.89	13.99	2.73	1.71
4.0					4.0	Rebound		V.Dense														
		Rock																				

Legend:

SP Poorly graded sand
SW Well graded sand
SM-SW- Silty sand
SC- Clayey sand
GW- Well graded gravel
GP- Poorly graded gravel
ML- Silt or clayey silt
CL- Silty clay
MI- Clayey silt
CI - Sandy clay
CH- High Plasticity clay
UDS - Undisturbed sample
Rebound
* Self Pentration
CRR- Core Recovery Ratio (for Rock)

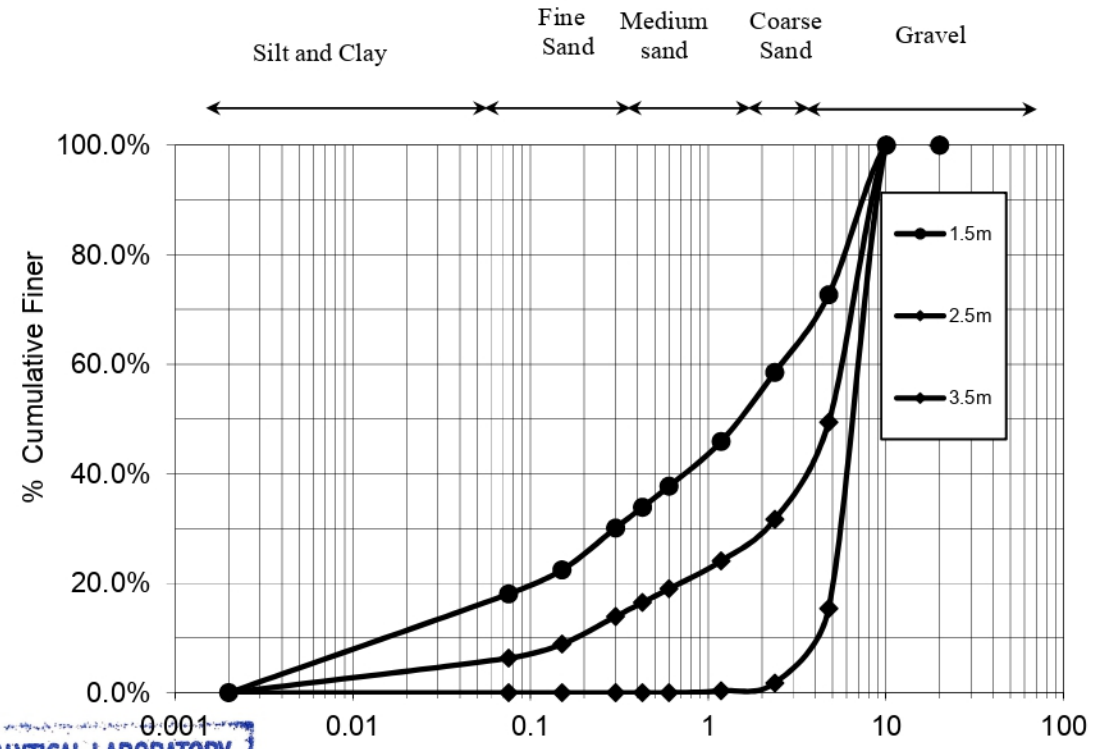
Logged by
Junior Engineer

Checked by
General Manager

For ASHHIRWAAD ANALYTICAL LABORATORY
Authorised Signatory

BH - 1

GRAIN SIZE DISTRIBUTION CURVE

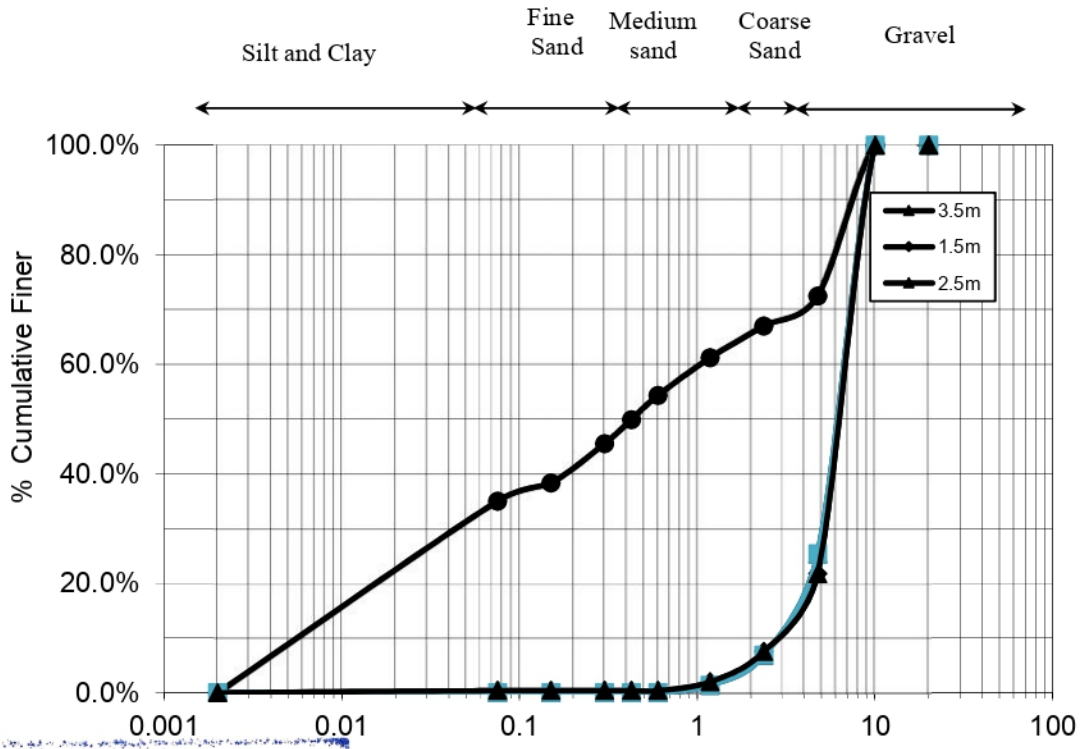


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BH - 2

GRAIN SIZE DISTRIBUTION CURVE

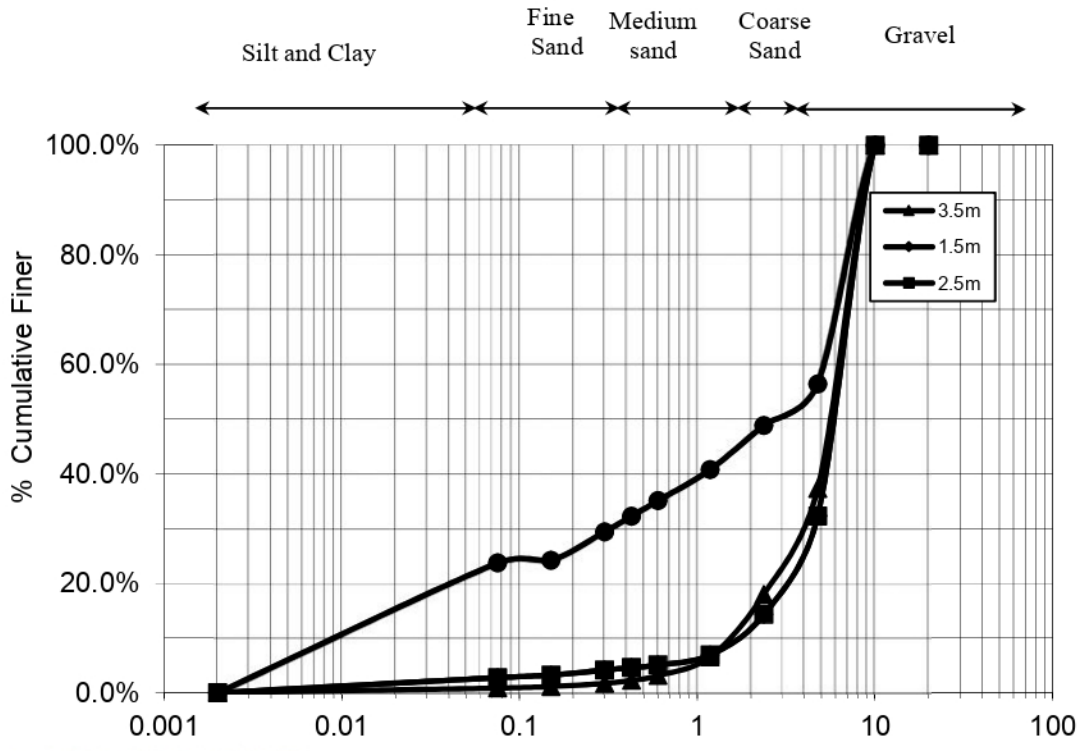


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BH - 3

GRAIN SIZE DISTRIBUTION CURVE

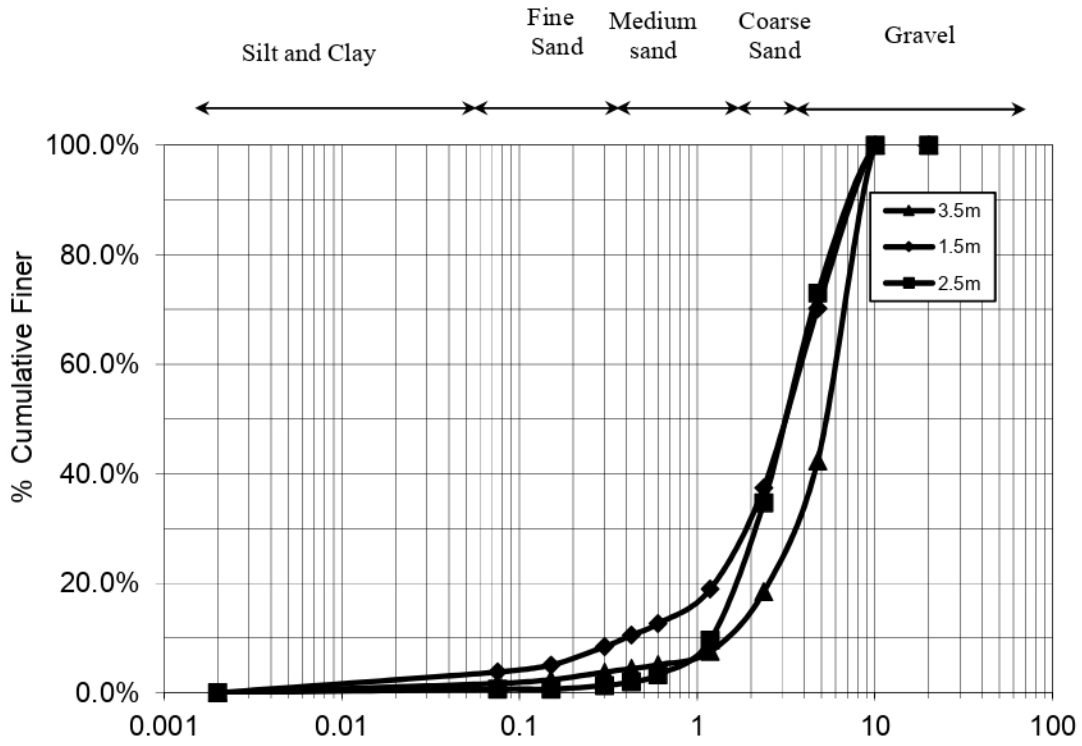


For ASHHIRWAAD ANALYTICAL LABORATORY

Authorised Signatory

BH - 4

GRAIN SIZE DISTRIBUTION CURVE



For ASHHIRWAAD ANALYTICAL LABORATORY

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8. SBC RECOMMENDATIONS:

Based on the soil stratification obtained during the geotechnical exploration and consequent laboratory experiment datas, the safe bearing capacities for the following foundation system is recommended below.

8.1 Considering in situ condition, **ISOLATED/COMBINED FOOTING** is recommended for the **Proposed Construction Of Appartment Building(S+5) at Plot No:MSB-12,New Vision Township, Anna Main Road, St.Thomas Mount Panchayat, Vengambakkam, Chennai, Tamil Nadu-600048..**

8.2 The recommended **Safe Bearing Capacities** at different depths are calculated and tabulated below along with the allowable settlement.

Table 8.2.1.

Safe Bearing Capacity Calculation As per IS 6403:1981

Sl. No.	Bore Hole No	Depth in meter from NGL	SBC in T/m²	Total Allowable Settlement (mm) As per IS:1904-1986 (Reaffirmed 2006)
1.	BH-1, BH-2, BH-3 & BH-4	1.5	24	50
2.		1.75	26	50
3.		2.0	28	50
4.		2.25	30	50
5.		2.5	32	50

For ASHHIRWAAD ANALYTICAL LABORATORY

Authorised Signatory

Ref: AAL/9182/GT-Report/P.No.1968/ Vengambakkam/TN/2021-22 Date: 04.12.2021

*NGL- Natural Ground Level

8.3 The width of footing should not be less than 1.50m in order to satisfy the stability requirements.

8.4 The Decision of selecting the suitable depth of foundation rests with the Structural Engineer Concerned.

8.5 For the sub structure [RCC] the environmental exposure condition may be considered as **'Moderate'** and all the precautions as laid by the relevant code of practice for the design of structures may be adopted.

8.6 The entire recommendations as above are based on four bore holes executed as per the Clients directions and at the location as shown by the client's representative as per terms of reference. The uniformity or otherwise of the soil delineation and strength profile over the entire site shall be verified during execution, If there are any variations the same shall be reported to us for review and further advice.

For ASHHIRWAAD ANALYTICAL LABORATORY

Authorised Signatory

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(NABL Accredited Laboratory)

Place : Puducherry
Date : 04.12.2021.

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