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GEOTECHNICAL INVESTIGATION REPORT

for Residential Building at Murugesan Street, Rangarajapuram, Kodambakkam, Chennai

EXECUTIVE SUMMARY

M/s. KCee Homes LLP, Chennai are proposing to construct a Residential Building at Murugesan Street, Rangarajapuram, Kodambakkam, Chennai - 600024.

The site for the proposed Residential Building is situated at No.: 11C and 11D on the Southern side of Murugesan Street in Rangarajapuram, Kodambakkam, Chennai - 600024. The site measures approximately 17m x 35m in size. The site is having boundary walls on all the sides and is fairly level in topography. There are two wells of about 1.2m diameter situated in the South Western side of the site and water table was observed at 0.5m depth in both the wells during the period of field investigations. Vegetation in the form of trees were observed within the site during the period of field investigations.

The proposed Residential building consists of an open stilt floor at ground level and five upper floors.

Geotechnical investigations have been undertaken at the site as per the scope of investigations, stipulated by the client, which consisted of conducting 2 boreholes down to 6m depth.

The results of the investigations have shown the presence of filled up strata (building materials with brickbats) down to 1m depth (only at the location of borehole BH2) below which virgin soil was encountered. The virgin soil is Brown silty sand down to the termination depth of 6m depth below existing ground level. A layer of brown sandy clayey silt was encountered from ground level to 2.3m depth below existing ground level only at the location of borehole BH1.

The soil strata is in a medium stiff/medium dense state from existing ground level down to the termination depth of 6m below existing ground level.

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Ground water was encountered between 0.5 and 0.7m depth in the boreholes during the period

of field investigations. This high water table might be due to the rains prior and during the period of field investigations and may go down in due course fo time.

In view of the observed subsoil conditions, the proposed residential building can be supported on *Isolated/Strip Footings laid at a minimum depth of 1.8m below the existing ground level with a Net allowable bearing pressure of 12t/m^2 (1.2kg/cm^2) for widths of foundations ≥1.5m.*

The excavated soil (at the location of borehole BH1) cannot be used for backfilling purposes as the soil is medium swelling type.

After the excavation for the foundations, the top slush should then be removed and the surface compacted heavily. If any loose pockets are observed, the same shall be filled with brickbats/ gravel and compacted well. Foundations can subsequently be placed over such a prepared surface.

Stiff Tie-beams connecting the columns in both directions may be provided which will render additional rigidity to the structure.

There are two wells located within the site. In case, the wells are not utilised, the wells can be closed by backfilling with sand-gravel mix. The backfilling should be done in layers and well compacted. In case the wells are to be utilised, the sides should be properly lined. Additionally, the distance of the nearest footing to the well should not be less than the width of the footing.

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REPORT ON GEOTECHNICAL INVESTIGATION FOR

RESIDENTIAL BUILDING AT MURUGESAN STREET,

RANGARAJAPURAM, KODAMBAKKAM, CHENNAI

1.0 INTRODUCTION

1.1 Overview

1.1.1 M/s. KCee Homes LLP, Chennai are proposing to construct a Residential Building at Murugesan Street, Rangarajapuram, Kodambakkam, Chennai - 600024.

1.1.2 The geotechnical investigations have been carried to ascertain the soil conditions for the design of foundations of the proposed Residential building.

1.2 Authority

A detailed geotechnical investigations programme has been conducted as per the authorisation by M/s. KCee Homes LLP, Chennai vide their mail confirmation dated 15.11.2023.

2.0 PROJECT DETAILS

2.1 Site Location

The site for the proposed Residential Building is situated at No.: 11C and 11D on the Southern side of Murugesan Street in Rangarajapuram, Kodambakkam, Chennai - 600024.

2.2 Site Layout and Topography

2.2.1 The for the proposed Residential Building site measures approximately 17m x 35m in size. The site is having boundary walls on all the sides and is fairly level in topography. There are two wells of about 1.2m diameter situated in the South Western side of the site and water table was observed at 0.5m depth in both the wells during the period of field investigations. Vegetation in the form of trees were observed within the site during

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the period of field investigations.

2.2.2 The colour of the exposed soil surface is Brown.

2.3 The Structure

As per information provided by the client, the proposed Residential building consists of an open stilt floor at ground level and five upper floors.

2.4 Seismic Zone

Site for the proposed Residential building is situated in Kodambakkam, Chennai which falls under Seismic Zone III as per IS 1893 (Part 1) - 2016.

2.5 Geographical Information

2.5.1 Site for the proposed Residential building is situated at:

a) Latitude : 13˚02'

b) Longitude : 80˚13'

3.0 OBJECT OF INVESTIGATIONS

3.1 For designing the foundation system of the proposed residential building, the following data are required:

a) Type of foundation system.

b) Depth below the ground level at which the foundation system is to be laid.

c) Allowable bearing pressure on the foundations levels.

3.2 To determine above factors, the following information would be required:

a) The subsoil profile indicating thicknesses of the various soil strata, to a depth down to the influence zone below the foundations.

b) Engineering properties of the soil strata at various levels.

c) Physical characteristics of the soil strata.

d) Variation of the strength of the strata with depth.

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3.3 For evaluating the above parameters, field investigations and laboratory investigations on the soil samples collected during the field investigations, have been carried out.

3.4 The results from these investigations have been analysed to provide the recommendations for the design of foundations.

4.0 SCOPE OF INVESTIGATIONS

4.1 Scope of investigations as given in the work order consisted of :

a) Conducting 2 boreholes down to a depth of 6m, as required by the client.

b) Conducting standard penetration tests at 1.5m intervals.

c) Recovering undisturbed soil samples from various levels of the subsoil strata.

d) Recording ground water table levels, if met with.

e) Conducting relevant laboratory tests on soil samples recovered.

f) Preparation and submission of a technical report containing the details of the tests carried out, their analysis and recommendations regarding the foundation system to be adopted. Two copies of the report are to be submitted.

5.0 FIELD INVESTIGATIONS

5.1 General Details

5.1.1 The locations of the boreholes were shown at site by the client's representative. A Schematic site plan showing the boreholes locations marked by the client is given in fig.1.

5.1.2 Weather was clear during the period of field investigations which were carried out in the fourth week of November 2023.

5.2 Boreholes

5.2.1 The boreholes were progressed by shell and auger method.

5.2.2 The boreholes were terminated at 6m depth below the existing ground level as per the

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stipulated scope of work.

5.2.3 The depths at which ground water table was encountered in the boreholes during the period of field investigations and termination depths of the boreholes are given below:

Borehole No.	Depth of Ground Water Table Below EGL (m)	Termination Depth Below EGL (m)
1	0.5	6
2	0.7	6

5.2.4 Ground water was encountered between 0.5 and 0.7m depth in the boreholes during the period of field investigations. This high water table might be due to the rains prior and during the period of field investigations and may go down in due course fo time.

5.2.5 Standard Penetration Tests were conducted in soil strata at 1.5m depth intervals.

5.2.6 Disturbed soil samples recovered from split spoon sampler were packed in polythene bags, labelled and retained for identification purposes.

5.2.7 Undisturbed soil samples were recovered by thin walled tubes conforming to IS 2132. These tubes had an area ratio of less than 10%. The diameter of soil samples were 50mm and length 45cm.

6.0 LABORATORY INVESTIGATIONS

6.1 The soil samples brought to the laboratory were subjected to various tests to determine the following properties

a) Type of soil and its gradation

b) Consistency limits

c) Natural density

d) Natural water content

e) Shear strength properties

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6.2 In order to determine the above properties listed in 6.1, the following tests were conducted.

a) Sieve analysis on the coarse grained soil fraction

b) Hydrometer analysis on the fine grained soil fraction

c) Liquid and plastic limits

d) Natural Density and Water Content tests

e) Triaxial compression tests

f) Free Swell Index tests

7.0 RESULTS AND ANALYSIS

7.1 Presentation of Results

7.1.1 The results of borehole investigations and of the laboratory investigations conducted on the soil samples collected from the boreholes have been presented in the form of soil profile tables in Table Nos.1 & 2.

7.1.2 The soil profile tables indicate the following:

a) Standard Penetration Test Values (i.e. N- values observed) at various depths

b) Soil description identifying the type of soil

c) Grain size analysis indicating composition of subsoil

d) Consistency limits

e) In-situ bulk density and Water content

f) Triaxial compression test results

7.2 Analysis of Soil Profile

7.2.1 A perusal of the data presented in the soil profile tables indicate the presence of the following substrata.

a) Stratum - I : Filled up (Building materials with brickbats)

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b) Stratum - II : Brown sandy clayey silt

c) Stratum - III : Brown silty sand

7.2.2 The thicknesses in each borehole of each strata described in 7.2.1 is given in the table below:

BH No.	Depth (m) : from - to		
	Stratum - I	Stratum - II	Stratum - III
1	-	0.0 - 2.3	2.3 - 6
2	0.0 - 1	-	1 - 6

7.2.3 The above results show that :

a) Stratum - I consisting of Filled-up strata (Building materials with brickbats) has been encountered from ground level to 1m depth below existing ground level only at the location of borehole BH2.

b) Stratum - II consisting of Brown sandy clayey silt having significant percentages of silt and varying percentages of clay and sand, has been encountered from ground level to 2.3m depth below existing ground level only at the location of borehole BH2.

c) Stratum - III consisting of Brown silty sand having significant percentages of sand and varying percentages of silt, has been encountered from 1/2.3 to down to the termination depths of 6m below existing ground level.

7.3 Soil Composition

7.3.1 The grain size distribution of the soil samples at various depths, as determined in the laboratory have been presented in the form of grain size analysis curves in fig. 3.

7.3.2 The variations in the grain size distribution of the soil across the boreholes are as follows:

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a) Stratum - II : Brown sandy clayey silt

BH No.	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
1	0	24	46	30

b) Stratum - III : Brown silty sand

BH No.	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
1	0	90 - 93	7 - 10	0
2	0	91 - 95	5 - 9	0

7.3.3 The above results indicate that :

a) Stratum - II consists of about 24% of sand, 46% of silt and 30% of clay.

b) Stratum - III consists of about 5-10% of silt and 90-95% of sand.

7.4 In-situ Density, Water Content and Dry density

7.4.1 The bulk/in-situ bulk densities, water contents and dry densities obtained from undisturbed soil samples are tabulated below.

BH No.	Depth (m)	In-situ Bulk Density (g/cm^3)	Water Content (%)	Dry Density (g/cm^3)
1	1.5	1.96	18.4	1.66
2	2	1.96	8.1	1.81

7.4.2 The above results indicate that the soil strata is in a medium stiff/medium dense state. Undisturbed soil samples could not be collected below 2m depth as the samples were cohesionless and sampling was done below ground water table level.

7.5 Consistency Limits

7.5.1 The Consistency Limits determined for the soil in Stratum - II (Brown sandy clayey silt) indicate that the liquid limit varies at 43%, plastic limit varies at 18% and plasticity index varies at 25%.

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7.5.2 The Consistency Limits determined for the soil in Stratum - III (Brown sandy clayey silt) indicate that the soil in this stratum is non plastic in nature.

7.5.3 The Consistency Limits indicate that the soil in :

a) Stratum - II (Brown sandy clayey silt) is medium plastic in nature

b) Stratum - III (Brown sandy clayey silt) is non plastic in nature.

7.6 Standard Penetration Tests

7.6.1 Standard Penetration Test values (N-values observed) are presented in the soil profile table nos.1 & 2.

7.6.2 Standard Penetration Test values (N-values observed) have also been presented in form of plots of N values vs depth in fig.4.

7.6.3 The N-values indicate that the soil is in a medium stiff/ medium dense state down to the investigated depth of 6m below existing ground level with observed N-values ranging between 8 to 41.

7.7 Triaxial Test Results

The cohesion 'c' obtained from consolidated drained triaxial compression test varies at 0.28kg/cm² and the angle of shearing resistance 'ϕ' of the soil varies between 17° & 29°.

7.8 Free Swell Index

7.8.1 The free swell index of the soil samples collected at various depths are given below:

BH No.	Free Swell Index (%) at Depth (m)			
	1	1.5	2.5	3
1	43.8	-	3.2	-
2	-	4.1	-	3.6

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7.8.2 The above results indicate that the soil strata at 1m depth at the location of borehole BH1 is medium swelling in nature. Hence, the excavated soil cannot be used for

backfilling purposes. However, the excavated soil at the location of borehole BH2 can be used for backfilling purposes.

7.9 Compiled Soil Profile

7.9.1 An overview of the results and their analysis has been presented in the form of a compiled soil (fig. 2).

7.9.2 The above figure shows the various strata encountered and their thicknesses in each of the boreholes and also gives the soil composition and the observed N-values at various depths along with the depth at which undisturbed soil samples were collected.

8.0 DESIGN CRITERIA

8.1 Design Parameters

8.1.1 The parameters required for the design of foundation system for the proposed residential building are:

a) Type of foundation to be adopted

b) Depth at which the foundations have to be laid

c) Allowable bearing pressure on the soil at the foundation level

8.1.2 On the basis of the analysis of the results of investigations, the required design parameters have been arrived at and are given in the following sections.

8.2 Type of Foundations

8.2.1 The type of foundation depends on the following:

a) Subsoil conditions

b) Type of structure

c) Configuration at loading points

8.2.2 As per information provided by the client, the proposed Residential Building consists of an open stilt floor at ground level and five upper floors.

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8.2.3 The results of the investigations have shown that the soil strata is in a medium stiff/medium dense state from existing ground level down to the termination depth of 6m below existing ground level.

8.2.4 In view of the above, *Shallow Foundation -Isolated/Strip Footings* can be adopted for the proposed residential building.

8.3 Depth of Foundations

8.3.1 The depth at which foundations should be laid will be governed by the following criteria.

a) Top filled up strata/loose soil, if any

b) There should be sufficient thickness of soil above the footing/foundations so that the bearing capacity of the soil can be fully mobilised.

c) Soil below the level of footings/foundations should have the requisite strength to support the anticipated bearing pressures on the foundations without allowing the settlement of footings/foundations to exceed the acceptable limits.

d) Requirements of the type of structure (Residential Building consisting of an open stilt floor at ground level and five upper floors).

8.3.2 In view of the above factors, foundations of the proposed residential building can be made to rest at a minimum depth of *1.8m below the existing ground level*. The soil available at the founding level will be Brown sandy clayey silt/silty sand.

8.4 Allowable Bearing Pressure

8.4.1 Allowable bearing pressure has been evaluated by:

a) Shear failure criteria based on the average soil data

b) Settlement criteria based on the SPT values (N-values)

c) Settlement criteria based on deformation modulus

8.4.2 An allowable settlement of 50mm has been considered to evaluate the allowable bearing pressure for Isolated/Strip footings.

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8.4.3 A water table correction factor of 0.5 has been considered.

8.4.4 On the basis of the above analysis, *net allowable bearing pressure of 12t/m² can be adopted for widths of foundations ≥1.5m.*

9.0 RECOMMENDATIONS

9.1 Type of Foundations

Shallow Foundation - Isolated/Strip Footings

9.2 Depth of Foundations

Minimum 1.8m depth below the existing ground level

9.3 Allowable Bearing Pressure

Net Allowable Bearing Pressure of 12t/m² for widths of footings ≥1.5m for an allowable settlement of 50mm.

9.4 Construction Advisories

9.4.1 The soil of each strata has been described with name, colour etc. During excavation, any variations observed in the nature and condition of the soil from those given in this Report should be noted and appropriate action should be taken.

9.4.2 The excavated soil at the location of borehole BH2 cannot be used for backfilling purposes as the top soil is medium swelling type.

9.4.3 After the excavation for the foundations, the top slush should then be removed and the surface compacted heavily. If any loose pockets are observed, the same shall be filled with brickbats/ gravel and compacted well. Foundations can subsequently be placed over such a prepared surface.

9.4.4 Stiff Tie-beams connecting the columns in both directions may be provided which will render additional rigidity to the structure.

9.4.5 There are two wells located within the site. In case, the wells are not utilised, the wells can be closed by backfilling with sand-gravel mix. The backfilling should be done in layers and well compacted. In case the wells are to be utilised, the sides should be

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properly lined. Additionally, the distance of the nearest footing to the wells should not be less than the width of the footing.

9.5 Appendices

9.5.1 The calculations for the allowable bearing pressure have been provided in Appendix-A of this report.

9.5.2 The List of IS codes referred for providing the recommendations and that which might be required to implement the same have been given in Appendix-B of this report.

9.6 Notes

9.6.1 The recommendations given in this report have been arrived at on the basis of design parameters which have been judiciously adopted by giving due consideration to the results of field and laboratory investigations as well as NAGADI's experience of over four decades in working in various types of soil and rock conditions all over India.

9.6.2 The entire report should be studied before adopting the recommendations given in the report.

10.0 LIMITATIONS

This Geotechnical investigation has been carried out at locations in the site chosen by the client as representing the entire site. The recommendations provided in this Report are hence valid only for those test locations. However, if there is any change in the subsoil conditions and properties at places between or beyond the chosen test locations, Nagadi may be contacted for further actions. Fresh investigations will have to be carried out at such locations.

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ANALYSIS FOR ALLOWABLE BEARING PRESSURE

Data

(i) Soil Properties :

c (kg/cm^2) = 0.28 ϕ = 18° γ (g/cm^3) = 1.95

(ii) Depth of Foundation, D (m) = 1.8

(iii) Allowable Settlement, s (mm) = 50

Shear Failure Criterion (Ref. IS : 6403)

N_c = 11.25 N_q = 4.14 N_γ = 2.90 R_w = 0.50 R_w' = 0.50

$$q_s = \frac{1}{3}\left(c \cdot N_c + \gamma D \cdot N_q \cdot R_w + 0.5 \cdot \gamma \cdot B \cdot N_\gamma \cdot R'_w\right) - \gamma D.R_w$$

B (m)	1.5	≥3.0
q_s (t/m^2)	11.9	12.6

Settlement Criterion (Ref. IS : 8009)

(i) From N Values

B (m)	1.5	≥3.0
H (m)	3	6
N_{av}	18	21
q_a (t/m^2)	18.7	18.9

(ii) From Triaxial Compression Tests : $q_a = \dfrac{s \cdot E}{0.7 \cdot H}$

B (m)	1.5	≥3.0
H (m)	3	6
E (kg/cm^2)	80	105
q_a (t/m^2)	19.0	12.5

ADOPT	**B (m)**	**1.5**	**≥3**
	q (t/m^2)	**12**	**12**

Note : q_s and q_a are NET VALUES, Weight of backfill etc. need not be added to the loading except in case of filling above original G.L.

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Appendix B

LIST OF IS CODES

Field Investigation

1. IS : 1498 - 1970 : Classification and identification of soils for general engineering purposes (First Revision) (Amendment 2)
2. IS : 1892 - 1979 : Code of practice for sub surface investigations for foundations (First revision)
3. IS : 2131 - 1981 : Method of Standard Penetration Tests for soils (First revision)
4. IS : 2132 - 1986 : Code of practice for thin walled tube sampling of soils (Second revision)

Laboratory Tests

1. IS : 2720 - 1983 (Part 1) : Methods of test for soils: Preparation of dry soil samples for various tests (Second revision)
2. IS : 2720 - 1980 (Part 2) : Method of test for soils: Determination of water content (Second revision) Amendment 1
3. IS : 2720 - 1980 (Part 3/Sec 1) : Method of test for soils : Determination of Specific Gravity : Fine grained soils. (First revision)
4. IS : 2720 - 1980 (Part 3/Sec 2) : Method of test for soils : Determination of Specific Gravity : Fine, Medium & Coarse grained soils. (First revision).
5. IS : 2720 - 1985 (Part 4) : Method of test for soils : Grain size analysis (Second revision)
6. IS : 2720 - 1985 (Part 5) : Method of test for soils : Determination of liquid and plastic limit (Second revision)
7. IS : 2720 - 1977 (Part 40) : Methods of tests for soils: Determination of free swell index of soils.

Foundation Construction

1. IS : 1080 - 1986 : Code of practice for design and construction of shallow foundations on soils (other than raft, ring and shell) (Second revision)
2. IS : 1904 - 1986 : Code of practice for design and construction of foundation in soils: General requirements (Third revision)
3. IS 6403 - 1981 : Code of practice for determination of bearing capacity of shallow foundations : First revision (Amendment 1)
4. IS 8009 - 1976 (Part 1) : Code of practice for calculation of settlements of foundations : Shallow foundations subject to symmetrical static vertical loads (Amendment 2)

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Job No. G(C)9880

Sheet No. : 1

SOIL PROFILE

Project: Residential Building at Murugesan Street, Rangarajapuram, Kodambakkam, Chennai - 600024.

B. H. Location: | Water Table: 0.5m | Term. Depth : 6.0m | B.H. No. : 1

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density * (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	Φ (°)
	0.0	Ground level											
8	1.0	Brown sandy clayey silt	0	24	46	30	43	18					
	1.5	Brown sandy clayey silt							1.96	18.4	CD	0.28	17
	2.3	Change of strata											
16	2.5	Brown silty sand	0	93	7	0	-	NP					
	3.0	Brown silty sand							Sample slipped				
23	4.0	Brown silty sand	0	90	10	0	-	NP					
	4.5	Brown silty sand							Sample slipped				
	5.5	Brown silty sand	0	93	7	0	-	NP					
	6.0	Brown silty sand											

*-Natural Bulk Density # -N Values (Observed)

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Sheet No. : 2

SOIL PROFILE

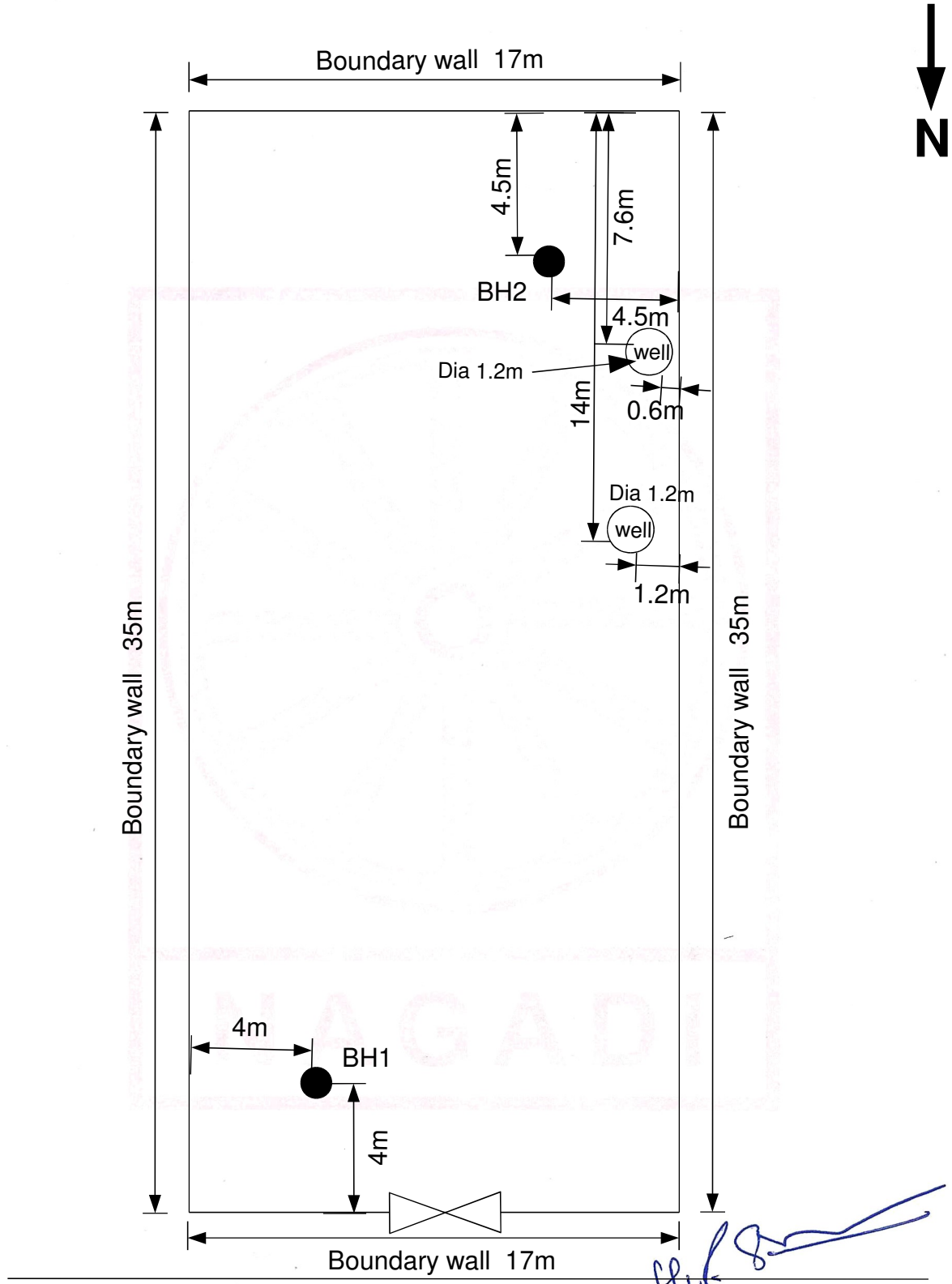
Project: Residential Building at Murugesan Street, Rangarajapuram, Kodambakkam, Chennai - 600024.

B. H. Location: | Water Table: 0.7m | Term. Depth : 6.0m | B.H. No. : 2

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density * (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	ϕ (°)
	0.0	Ground level											
	0.5	Filled up (Building materials with brickbats)											
	1.0	Change of strata											
12	1.5	Brown silty sand	0	91	9	0	-	NP					
	2.0	Brown silty sand							1.96	8.1	DS	-	29
18	3.0	Brown silty sand	0	94	6	0	-	NP					
	3.5	Brown silty sand							Sample slipped				
29	4.5	Brown silty sand	0	95	5	0	-	NP					
	5.0	Brown silty sand							Sample slipped				
11	6.0	Brown silty sand	0	94	6	0	-	NP					

*-Natural Bulk Density # -N Values (Observed)

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LEGEND

● BH : Borehole

SCHEMATIC SITE PLAN
(NOT TO SCALE)

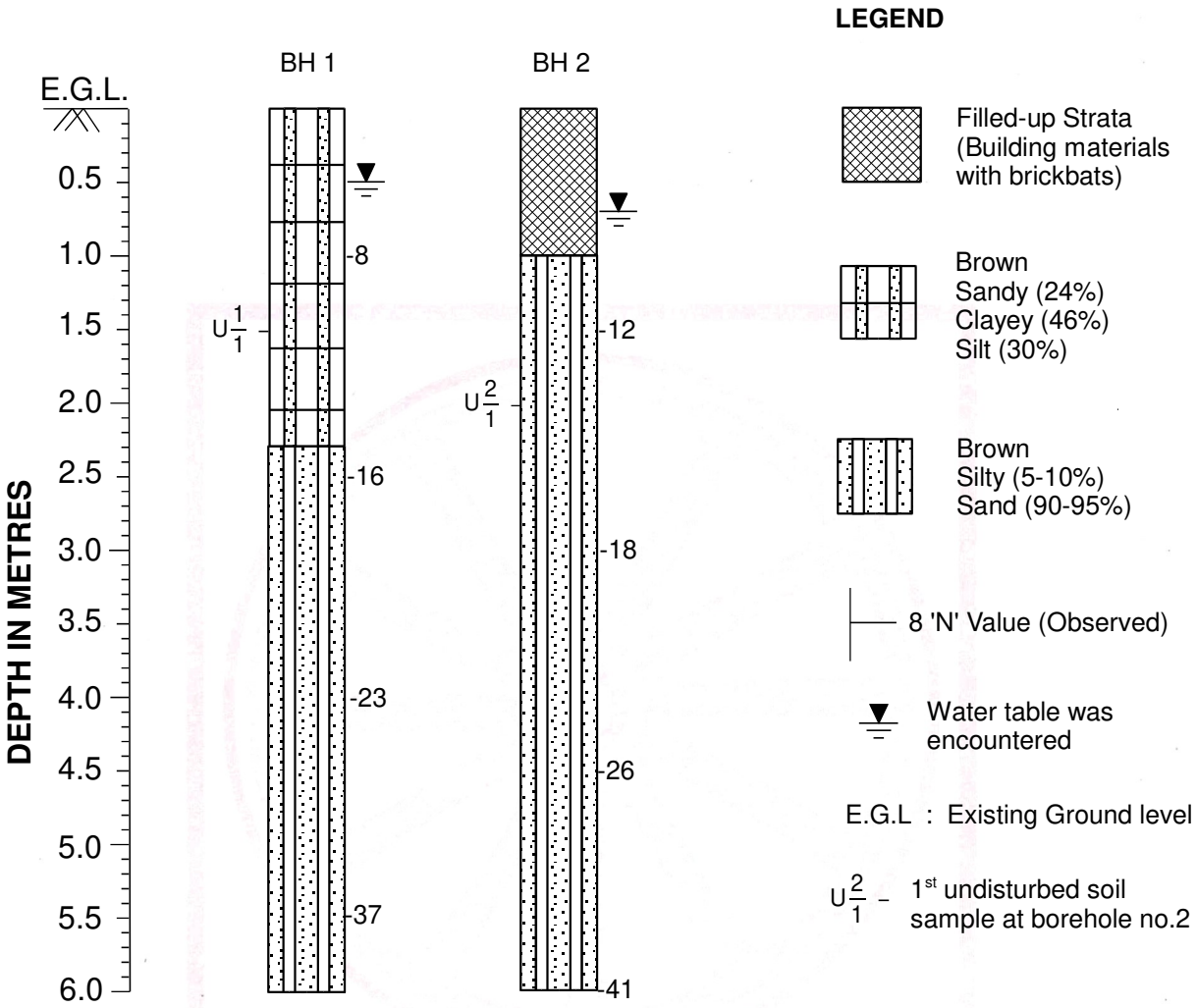
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Sheet No. : 1



COMPILED SOIL PROFILE

PROJECT : RESIDENTIAL BUILDING AT KODAMBAKKAM, CHENNAI - 600024

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Job No. : G(C)9880

Sheet No. : 2

NAGADI

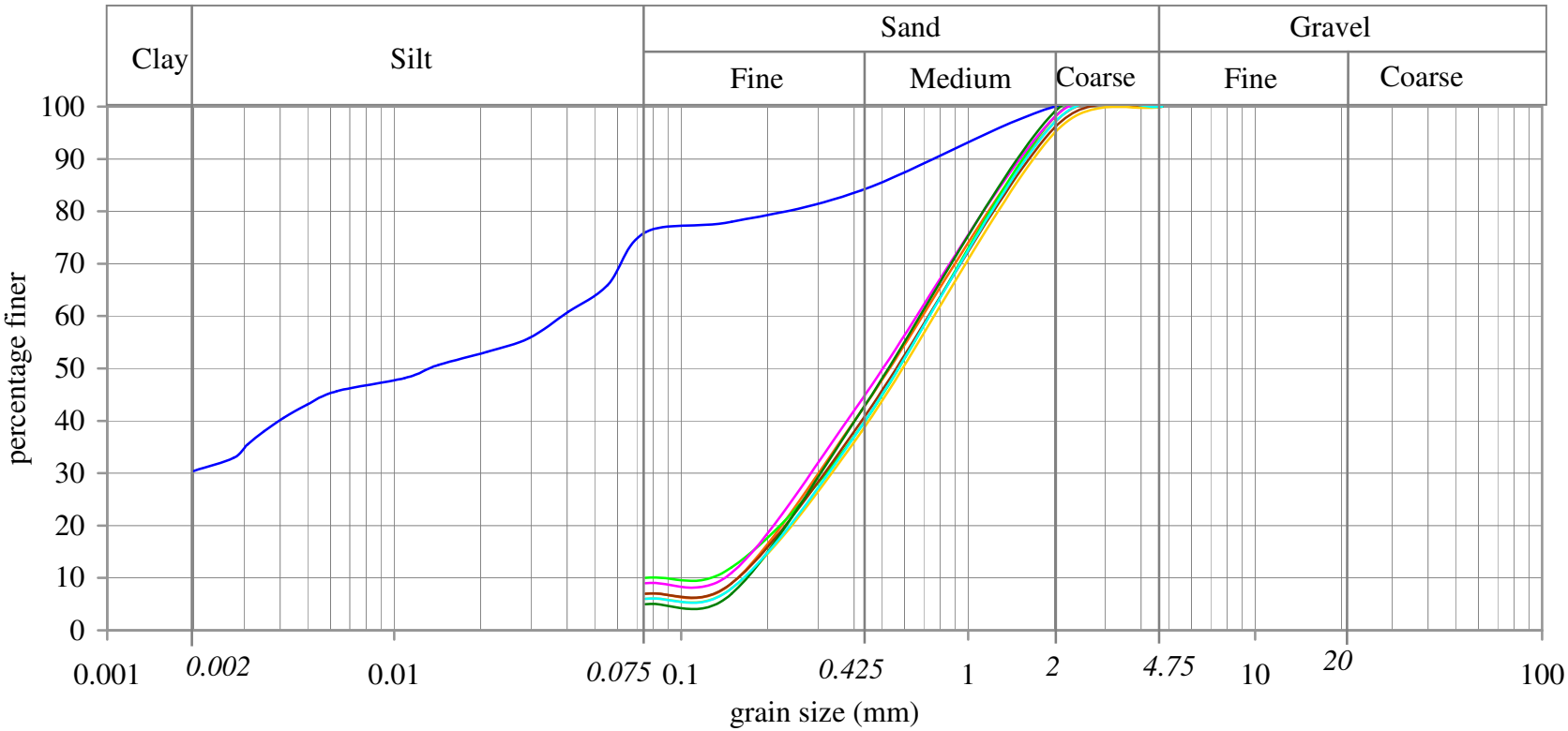
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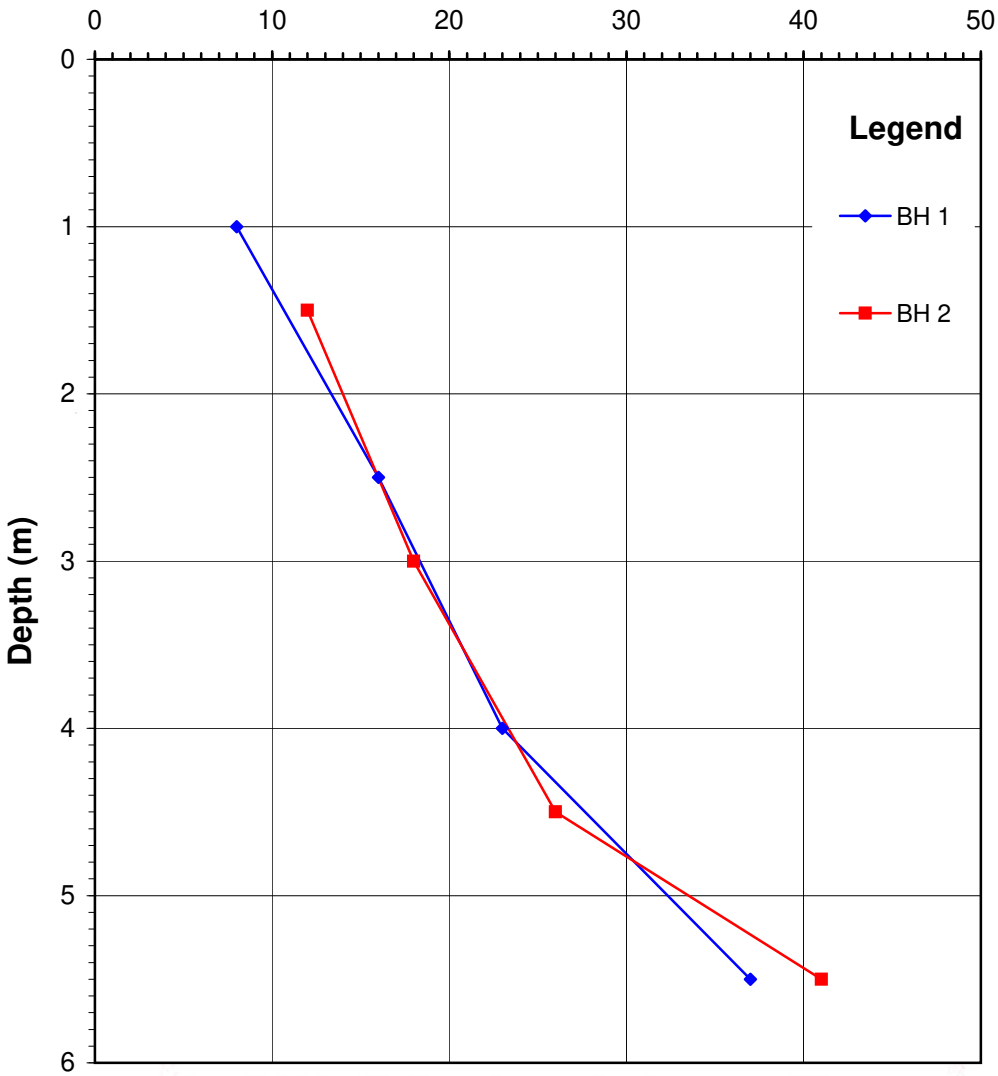
Sheet No. : 3



Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	1	1.0	Sandy clayey silt	0	24	46	30	0.040	-	-
	1	2.5	Silty sand	0	93	7	0	0.700	0.16	4.4
	1	4.0	Silty sand	0	90	10	0	0.700	0.75	0.9
	1	5.5	Silty sand	0	93	7	0	0.690	0.16	4.3
	2	1.5	Silty sand	0	91	9	0	0.680	0.15	4.5
	2	3.0	Silty sand	0	94	6	0	0.780	0.16	4.9
	2	4.5	Silty sand	0	95	5	0	0.690	0.17	4.1
	2	5.5	Silty sand	0	94	6	0	0.700	0.16	4.4

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SPT Values (Observed)



SPT Values (Observed) Vs Depth Curves

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Job No. : G(C)9880

Sheet No. : 4



our services doesn't just end there

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Compliance & Special Services

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empowering your real estate decisions with smart tools

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

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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

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Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management

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