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DEPARTMENT OF TECHNICAL EDUCATION
GOVERNMENT COLLEGE OF ENGINEERING
DHARMAPURI-636704.

REPORT NO: GCE/ DPI/ CIVIL/SOIL/2023/C-198 dt 22.11.23

PROJECT: PROPOSED CONSTRUCTION OF APARTMENT BUILDING (G+5) AT HOSUR TOWN WARD, A BLOCK 25, T. S. NO 4/2B, 4/2C & 4/5, KRISHNAGIRI.

TITLE: BOREHOLE SOIL INVESTIGATION FOR CONSTRUCTION OF APARTMENT BUILDING (G+5) AT HOSUR TOWN WARD, A BLOCK 25, T. S. NO 4/2B, 4/2C & 4/5, KRISHNAGIRI.

CLIENT: Thiru S.CM. Venkatachalam,
18,Plis Homes,
Visvanathapuram Village ,
Hosur, Krishnagiri.

DEPARTMENT OF CIVIL ENGINEERING

DEPARTMENT OF TECHNICAL EDUCATION

From
The Principal
Govt. College of Engineering
Dharmapuri-636704

TO
Thiru S.CM. Venkatachalam,
18,Plis Homes,
Visvanathapuram Village ,
Hosur, Krishnagiri.

LETTER NO: GCE/ DPI/ CIVIL/SOIL/2023/C-198 dt 22.11.23

Sir,

Sub: Borehole Soil Investigation report for the proposed construction of Apartment Building (G+5) at Hosur, Ward, A Block 25, T. S. No 4/2b, 4/2c & 4/5, Krishnagiri. - Reg

Ref : Lr.No.: Nil Dated: 07.11.2023

With reference to the above, Borehole Soil Investigation report for the proposed construction of Apartment Building (G+5) at , Hosur Ward, A Block 25, T. S. No 4/2b, 4/2c & 4/5, Krishnagiri. The receipt of the report may please be acknowledged.

PRINCIPAL

Encl: i) Bore log report

Department of Civil Engineering
Dharmapuri-636 704
Government College of Engineering

REPORT ON BOREHOLE SOIL INVESTIGATION REPORT FOR THE PROPOSED CONSTRUCTION OF APARTMENT BUILDING (G+5) AT HOSUR TOWN WARD, A BLOCK 25, T. S. NO 4/2B, 4/2C & 4/5, KRISHNAGIRI

GENERAL:

Thiru S.CM. Venkatachalam, 18, Plis Homes, Visvanathapuram Village, Hosur, Krishnagiri has in his letter dated: 07.11.2023, requested for borehole soil investigation for the proposed of construction of Apartment Building (G+5) at Hosur Town Ward, A Block 25, T. S. No 4/2b, 4/2c & 4/5, Krishnagiri. The borehole soil investigation was carried out during November 2023 through YUBE Prime Infra, Salem under the supervision of the Department of Civil Engineering, Government College of Engineering, Dharmapuri. The client suggested to explore the subsurface by drilling 3 boreholes covering the proposed area of construction. The scope of work includes drilling of all 3 boreholes up to depth of 10m with SPT and DS sampling at every 1.0m upto 6m and thereafter 1.5m upto 10m. The details required to decide on the depth of foundation, type of foundation and the foundation design parameters are to be obtained from the borehole data.

1.0 FIELD INVESTIGATION:

It was decided to make a total of 3 numbers of Boreholes. The 3 boreholes BH01, BH02 and BH03 of diameter 150mm were investigated upto a depth of 10.0m. Boreholes were advanced from the existing ground level using rotary drilling technique supplemented with bentonite mud circulation.

Standard Penetration Tests (SPT) was conducted at every 1.0m and at every change of strata. N – Value is defined as the number of blows required for the penetration of a Split Spoon Sampler for the last two 15cm penetrations. Coring was done in hard formations using Nx size coring tools fitted with Tungsten Carbide bits and diamond drill bits.

Standard Penetration Test which is universally known as SPT was conducted at the desired levels. N value is the output of SPT. N value is defined as the number of blows required for the penetration of a Split Spoon Sampler for the last two 15cm penetrations. It indicates the relative density of sand or gravel and the consistency of other soils such as silts or clays. The test was carried out as per IS 2131 – 1981.

The split spoon sampler is attached to drill rod and lowered to the bottom of the bore hole. A standard blow consists of dropping a mass of 63.5kg at a free fall of 750mm on to an anvil at the top of the rods was given and ensuring that this amount of dynamic energy is transferred to the sampler as much as possible.

The number of blows required to achieve each 150mm penetration is recorded until a total penetration of 450mm is achieved. The initial 150mm penetration is referred to as seating drive and the blows required for this penetration are not considered as soil in this zone is in disturbed condition. The next 300mm of penetration is referred to as the test drive and the number of blows required to achieve this fully is termed as penetration resistance or N-value.

2.0 LABORATORY INVESTIGATION:

The soil samples obtained using Split Spoon Sampler and core recoveries were analysed in the Geotechnical Engineering laboratory for its classification and the results are shown in the borehole logs as given in Fig 1, Fig 2, Fig 3.

3.0 SOIL PROFILE:

BH01:

The soil profile consists of filled up soil at the top for a thickness of 1.6 m followed by clay up to a depth of 2.0 m which is underlain by Silty sand upto 5m.From 5m,Soft Disintegrated Rock(SDR) occurred from 5m

to the depth of exploration of 10.0m. Core recovery value and RQD values are Nil.

BH02

The soil profile consists of filled up soil at the top for a thickness of 1.7 m followed by clay up to a depth of 2.0 m which is underlain by Silty sand upto 5m.Soft disintegrated rock (SDR) occurred from 5m to the depth of exploration of 10.0m. Core recovery value and RQD values are Nil

BH03

The soil profile consists of filled up soil at the top for a thickness of 1.7 m followed by clay up to a depth of 2.0 m which is underlain by Silty sand upto 5m.Soft disintegrated rock(SDR) occurred from 5m to the depth of exploration of 10.0m.Core recovery value is 10% and RQD values are Nil.

GROUND WATER TABLE:

Ground Water table is met within the depth of 2.0m from ground level. But Water table reduction factors are taken into consideration in calculating the allowable bearing capacity of soil.

4.0 ALLOWABLE BEARING CAPACITY AT THE PROPOSED DEPTH OF FOUNDATION:

The proposed building is a construction of Apartment Building (G+5) at Hosur Town Ward, A Block 25, T. S. No 4/2b, 4/2c & 4/5, Krishnagiri. The foundation shall be rested at a depth of 5.00m from the existing ground level on soft disintegrated rock (SDR). The Corrected N value taken as 33. The safe bearing capacity is worked out based on the N value taking into consideration shear the failure criterion and settlement criterion.

4.1. BEARING PRESSURE CORRESPONDING TO SHEAR FAILURE:

The net ultimate bearing capacity, q. (in kN/m^2) is given by

$$q_{nu} = 0.314N^2 B. Rw_2 + 0.943 (100 + N^2) Df. Rw_1$$

Where,

N	: SPT value
D_f	: Depth of foundation in m
B	: Minimum size of the foundation (taken as 2.0m)
R_1& R_2	: Water table correction factors (for the worst case, taken as 0.5)

$$q_{nu} = 0.314 \times 33^2 \times 2 \times 0.5 + 0.943 (100 + 33^2) 2.0 \times 0.5$$

$$q_{nu} = 1463.173 kN/m^2$$

q_s =487.72 kN/m^2 for a factor of safety of 3.

4.2. BEARING PRESSURE CORRESPONDING TO SETTLEMENT CONSIDERATION :

The safe bearing pressure, q_s, (in kN/m^2) corresponding to a settlement of 25mm is given by

$$q = 1.36 (N-3) \left(\frac{B + 0.3}{2 B} \right)^2 S.Rd. Rw_1$$

Where,

B: Maximum size of the footing (taken as 2.00m)

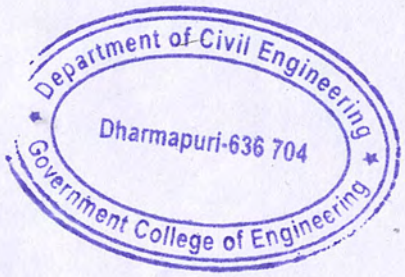
R: Water table correction factor (For the worst case, taken as 0.5)

$$q = 1.36(33-3) \left(\frac{2 + 0.3}{2 \times 2} \right)^2 25 \times 0.5 \times 1.2$$

$$q_s = 202.34 kN/m^2$$

5.0 DISCUSSIONS:

1. The foundation shall be rested on soft disintegrated rock (SDR). The allowable bearing capacity of SDR at a depth of 5.00m works out to 200kN/m^2 based on shear strength failure criterion and settlement criterion.



2. It is preferable to go in for framed structures with isolated /combined footing/Bored cast-in situ pile as required.

6.0 RECOMMENDATIONS:

1. The depth of foundation shall be taken as 5.00m from the existing ground level, so as to rest the foundation on Soft Disintegrated rock.
2. The allowable bearing capacity may be taken as 200kN/m^2 (20t/m^2) in the foundation design.
3. Framed structure with isolated/combined footing/Bored cast-in-situ pile shall be adopted, in the foundation design. In case of isolated/combined footing it is recommended to compact well before construction of footing.
4. As there is seepage of water from 2.0m, suitable dewatering techniques have to be adopted during construction.
5. **Any deviation if observed during execution other than that available as per bore log may be brought to the notice for further suggestions.**

22/11/23

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BORE HOLE LOG - Fig 1 (East)

PROJECT : Proposed Construction of G+5 Residential Complex

SITE : Hosur, Krishnagiri Dist.

B.H.No. 01

DIA & TYPE OF BORING : 150mm Rotary boring with drilling mud circulation

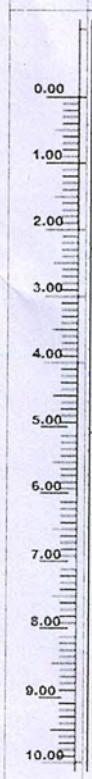
DIA OF BORING : 150mm

GROUND WATER TABLE :-

PROJECT NO : GCE/DPI/CIVIL/SOIL/C-198/2023

Date of Start : 17.11.23

Date of Finish : 20.11.23



BIS	RL	Log of BH	Depth (m)	N	Penetration Resistance (10 20 30 40 50 60)	SBC KN/m²	Core Recovery	RQD	Compressive strength	Remarks
Filled up Soil			1m	-			Nil	Nil	Nil	
			2m	---			Nil	Nil	Nil	
Clay			3m	14			Nil	Nil	Nil	
Silty Sand			4.5m	27			Nil	Nil	Nil	
			6m	>50		200	Nil	Nil	Nil	
Soft Disintegrated Rock (SDR)			7.5m	>50			Nil	Nil	Nil	
			9m	>50			Nil	Nil	Nil	
			10m				Nil	Nil	Nil	
							Nil	Nil	Nil	
							Nil	Nil	Nil	

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BORE HOLE LOG - Fig 2 (West)

PROJECT : Proposed Contruction of G+5 Residential Complex

SITE : Hosur, Krishnagiri Dist.

B.H.No. 02

DIA & TYPE OF BORING : 150mm Rotary boring with drilling mud circulation

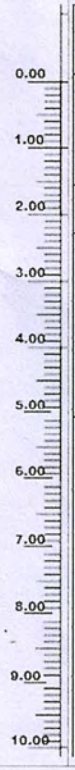
DIA OF BORING : 150mm

GROUND WATER TABLE :-

PROJECT NO : GCE/DPI/CIVIL/SOIL/C-198/2023

Date of Start : 17.11.23

Date of Finish : 20.11.23



BIS	RL	Log of BH	Depth (m)	N	Penetration Resistance 10 20 30 40 50 60	SBC KN/m^2	Core Recovery	RQD	Compressive strength	Remarks
Filled up Soil			1m	-			Nil	Nil	Nil	
			2m	---			Nil	Nil	Nil	
Clay			3m	11			Nil	Nil	Nil	
Silty Sand			4.0m	15			Nil	Nil	Nil	
			5m	>50		200	Nil	Nil	Nil	
Soft Disintegrated Rock (SDR)			6m	>50			Nil	Nil	Nil	
			7.5m	R			Nil	Nil	Nil	
			9m	R			Nil	Nil	Nil	
			10m	R			Nil	Nil	Nil	
							Nil	Nil	Nil	

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BORE HOLE LOG - Fig 3 (Middle)

PROJECT : Proposed Contruction of G+5 Residential Complex

SITE : Hosur, Krishnagiri Dist.

B.H.No. 03

DIA & TYPE OF BORING : 150mm Rotary boring with drilling mud circulation

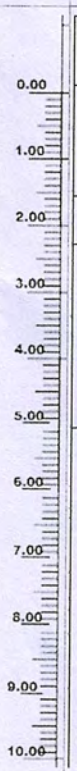
DIA OF BORING : 150mm

GROUND WATER TABLE :-

PROJECT NO : GCE/DPI/CIVIL/SOIL/C-198/2023

Date of Start : 17.11.23

Date of Finish : 20.11.23



BIS	RL	Log of BH	Depth (m)	N	Penetration Resistance (10 20 30 40 50 60)	SBC KN/m^2	Core Recovery	RQD	Compressive strength	Remarks
Filled up Soil			1m	-			Nil	Nil	Nil	
			2m	7			Nil	Nil	Nil	
Clay			3m	10			Nil	Nil	Nil	
Silty Sand			4.0m	24			Nil	Nil	Nil	
			5m	>50		200	Nil	Nil	Nil	
Soft Disintegrated Rock (SDR)			6m	>50			CR= 10%	Nil	Nil	
			7.5m	R			Nil	Nil	Nil	
			9m	R			Nil	Nil	Nil	
			10m	R			Nil	Nil	Nil	
							CR= 10%	Nil	Nil	

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