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DEPARTMENT OF TECHNICAL EDUCATION

From

The Principal,
Govt. College of Technology,
Coimbatore - 641 013.

To

The Managing Director,
PNR Prime Reality Ltd.,
Ram Nagar,
Coimbatore.

LETTER NO. : PCE/SOIL/CM 355/2022

dated: 29.04.2022

Sir,

Sub : Soil Investigation report for the proposed construction of G+5
Residential Complex at Ondipudur, Coimbatore - Reg

Ref : Letter No. Nil

dated: 06.04.2022

With reference to the above, the Borehole soil investigation report for the proposed construction of G+5 Residential Complex Building at Ondipudur, Coimbatore district is enclosed. The receipt of the report may please be acknowledged.

Encl: i) Borehole report

P. Th
29/04/2022
PRINCIPAL

29/4/2022

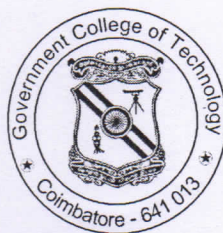
DEPARTMENT OF TECHNICAL EDUCATION
GOVERNMENT COLLEGE OF TECHNOLOGY,
COIMBATORE – 641 013.

REPORT NO. : PCE/SOIL/CM 355/2022 dated: 29.04.2022

Project : CONSTRUCTION OF G+5 RESIDENTIAL COMPLEX
AT ONDIPUDUR, COIMBATORE DIST.

Title : BOREHOLE SOIL INVESTIGATION FOR THE
PROPOSED CONSTRUCTION OF G+5 RESIDENTIAL
COMPLEX AT ONDIPUDUR, COIMBATORE.

Client : THE MANAGING DIRECTOR,
PNR PRIME REALITY LIMITED,
RAM NAGAR,
COIMBATORE.



GEOTECHNICAL DIVISION

DEPARTMENT OF CIVIL ENGINEERING

**REPORT ON BOREHOLE SOIL INVESTIGATION FOR THE PROPOSED
CONSTRUCTION OF G+5 RESIDENTIAL COMPLEX BUILDING AT
ONDIPUDUR, COIMBATORE DISTRICT.**

1.0 GENERAL:

The Managing Director, PNR Prime Reality Limited in his letter for Soil Test, dated: 06.04.2022 has requested for soil investigation for the proposed construction of G+5 Residential Complex Building at Ondipudur, Coimbatore district. The soil investigation was carried out during April 2022 through VKP Geotech, No.20, 2nd cross, 1st main road, SRP Nagar, Saibaba Colony, Coimbatore - 641011, under the supervision of the Geotechnical Division, Department of Civil Engineering, Government College of Technology, Coimbatore. After inspection of the site, it was decided to explore the subsurface by drilling 2 boreholes covering the proposed construction area. The scope of work includes drilling of the 2 boreholes up to a depth of 10m with SPT and sampling is done at every 1.0m. 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.

2.0 FIELD INVESTIGATION:

It was decided to make a total of 2 numbers of Boreholes. The two boreholes BH01 and BH02 of diameter 150mm were investigated upto a depth of 10.00m. Boreholes were advanced from the existing ground level using rotary drilling technique supplemented with bentonite mud circulation.

Standard Penetration Tests (SPT) were 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 penetration. 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 were 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 penetration. 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 free fall through 750mm on to an anvil at the top of the rods 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 the penetration resistance or N-value.

3.0 LABORATORY INVESTIGATION:

The soil samples obtained by way of Spoon Samples 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 and Fig 2.

4.0 SOIL PROFILE:

BH01:

The soil profile consists of filled up soil at top for a thickness of 2.30m followed by Poorly Graded Sand (SP) upto 3.00m and then followed by Soft Disintegrated Rock (SDR) upto 4.00m depth and underlain by Completely Weathered Rock (CWR) upto the depth of

exploration of 10.0m. The core recovery value ranges from 5% to 13%. RQD is Nil.

BH02

The soil profile consists of filled up soil at top for a depth of 1.00m followed by Poorly Graded Sand (SP) upto a depth of 2.00m and then followed by Poorly Graded Sand with silty fines (SP-SM) upto 3.00m which again is followed by Poorly Graded Gravel (GP) upto 4.00m and underlain by Completely Weathered Rock (CWR) upto the depth of exploration of 10.0m. The core recovery value is between 9% and 22%. RQD is Nil.

GROUND WATER TABLE:

Ground Water table was not met within the depth of investigation. But Water table reduction factors are taken into consideration in calculating the allowable bearing capacity of soil as the worst conditions.

5.0 ALLOWABLE BEARING CAPACITY AT THE PROPOSED DEPTH OF FOUNDATION:

The building is proposed to have G+5 floors. The foundation shall be rested at a depth of 4.00m from the existing ground level on Completely Weathered Rock (CWR). The N value was greater than 50. The safe bearing capacity is worked out based on the N value taking into consideration shear the failure criterion and settlement criterion.

5.1. BEARING PRESSURE CORRESPONDING TO SHEAR FAILURE :

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

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

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)

$$q_{nu} = 0.314 \times 50^2 \times 2 \times 0.5 + 0.943 (100 + 50^2) 2.0 \times 0.5$$

$$q_s = 1078.93 \text{ kN/m}^2 \quad (\text{taking a factor of safety of 3})$$

5.2. 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

$$q_s = 1.36 (N-3) \left(\frac{B + 0.3}{2 \times B} \right)^2 S.R.d. R_{w1}$$

Where,

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

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

$$q = 1.36(50-3) \left(\frac{2 + 0.3}{2 \times 2} \right)^2 0.5 \times 25 \times 1.2$$

$$q_s = 317 \text{ kN/m}^2$$

6.0 DISCUSSIONS:

1. The foundation shall be rested on Completely Weathered Rock (CWR).

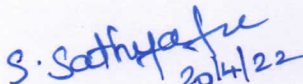
The depth of occurrence of Completely Weathered Rock (CWR) uniformly occurs at 4m on both the locations.

2. The allowable bearing capacity of Completely Weathered Rock (CWR) at a depth of 4.00m works out to 317 kN/m^2 based on shear strength failure criterion and settlement criterion.

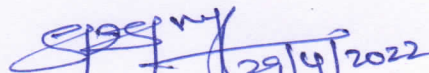
3. Framed structure with isolated /combined footing shall be adopted.

7.0 RECOMMENDATIONS:

1. The depth of foundation shall be taken as 4.00m from the existing ground level, so as to rest the foundation on Completely Weathered Rock (CWR).
2. The allowable bearing capacity may be taken as 250kN/m^2 (25t/m^2) in the foundation design.
3. Framed structure with isolated/combined footing shall be adopted, in the foundation design.
4. Any deviation if observed during execution other than that available as per bore log may be brought to the notice for further suggestions.

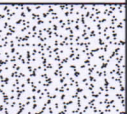
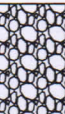
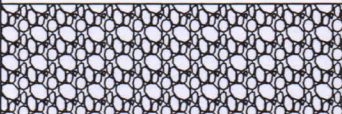
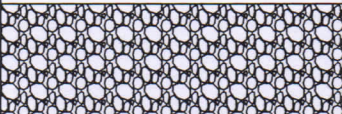

29/4/22
Asst. Prof. In Civil Engg.


29/4/2022
Prof. of Civil Engg. (CAS)


29/4/2022
for Prof. of Civil Engg. & HoD (Soils)

GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE-641013.

BOREHOLE LOG - Fig 1

PROJECT : Proposed Contruction of G+5 Residential Complex		D/A & TYPE OF BORING : 150mm Rotary boring with drilling mud circulation						DATE OF START : 15.04.2022									
SITE : Ondipudur,Coimbatore Dist.		DIA OF BORING : 150mm						DATE OF FINISH : 17.04.2022									
B.H.No. : 01		GROUND WATER TABLE :-															
		PROJECT NO : PCE/SOIL/CM-355/2022															
BIS	R.L.	Log of BH	Depth (m)	N	Penetration Resistance						SBC kN/m ²	Core Recovery %	ROD %	Compressive Strength N/mm ²	Remarks		
Filled up soil			1m	NIL	0	10	20	30	40	50	60		NIL	NIL	NIL		
			2m	>50									NIL	NIL	NIL		
			3m	>50									NIL	NIL	NIL		
			4m	>50									NIL	NIL	NIL		
Poorly graded sand (SP)			3m	>50								NIL	NIL	NIL			
Soft Disintegrated Rock (SDR)			4m	>50								9	NIL	NIL			
			5m										7	NIL	NIL		
			6m											10	NIL	NIL	
			7m											5	NIL	NIL	
			8m											10	NIL	NIL	
Completely Weathered Rock (CWR)			9m									13	NIL	NIL			
			10m														

Bore hole terminated at 10m from ground level

S. Sathya

29/4/22

ASST. PROF. IN CIVIL ENGG.

Prof. Of Civil Engg. (CAS)

29/4/2022

Prof. Of Civil Engg. & HOB (SOILS)

Bore hole terminated at 10m from ground level

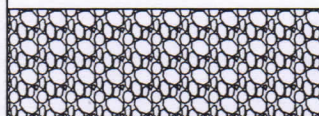
ASST. PROF. IN CIVIL ENGG.

PROF. OF CIVIL ENGG. (CAS)

PROF. OF CIVIL ENGG. & HDB (SOILS)

GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE-641013.

BOREHOLE LOG - Fig 2

PROJECT : Proposed Contruction of G+5 Residential Complex		DIA & TYPE OF BORING : 150mm Rotary boring with drilling mud circulation										DATE OF START : 14.04.2022				
SITE : Ondipudur,Coimbatore Dist.		DIA OF BORING : 150mm										DATE OF FINISH : 14.04.2022				
B.H.No. : 02		GROUND WATER TABLE :-														
		PROJECT NO : PCE/SOIL/CM-355/2022														
BIS	R.L.	Log of BH	Depth (m)	N	Penetration Resistance						SBC kN/m ²	Core Recovery %	RQD %	Compressive Strength N/mm ²	Remarks	
					0	10	20	30	40	50						60
Filled up soil			1m	30												
Poorly graded sand (SP)			2m	>50												
Poorly graded sand with Silt (SP-SM)			3m	>50												
Poorly graded Gravel (GP)			4m	>50												
Completely Weathered Rock (CWR)			5m										9	NIL	NIL	
			6m										22	NIL	NIL	
			7m										20	NIL	NIL	
			8m										15	NIL	NIL	
			9m										18	NIL	NIL	
			10m									22	NIL	NIL		

Bore hole terminated at 10m from ground level

S. Subhakar 29/4/22

ASST. PROF. IN CIVIL ENGG.

PROF. OF CIVIL ENGG.(CAS)

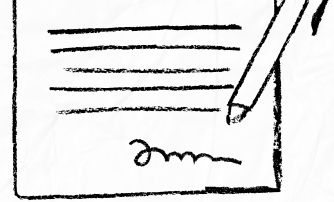
PROF. OF CIVIL ENGG.& MOD.(SOLIS)

Bore hole terminated at 10m from ground level

ASST. PROF. IN CIVIL ENGG.

PROF. OF CIVIL ENGG. (C&S)

PROF. OF CIVIL ENGG. & HOD (SOILS)



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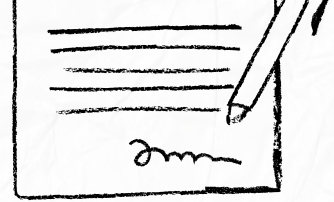
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