Soil-Investigation Report of Butberia

1. INTRODUCTION

A sub-soil investigation for foundation of the proposed Structures was conducted to ascertain the sub-soil condition and to recommend most suitable type of foundation that may be adopted for Design and construction of foundation for Proposed EWS Flats (G+4)at the proposed site under the projects preparation of housing for all plan of Action, DPR and PMC under PMAY for Cluster – IV.

Soil investigation work had been carried outby field investigation onlyas per relevant IS codes. The scope of work was limited to sinking of 'One' (1) no. of borehole at each site/location, conducting standard penetrationtests (SPT)at Site, Collection of samples for bore log and identification purposes and calculation of SBC based on the SPT value at founding depth.

The fieldwork for the sub-soil investigation, including all field tests and disturbed/undisturbed sampling and subsequently analysis of the field soil data and calculation of the SBC have been done in the month of **March, 2017.**

The entire field work has been carried out with due care. This report deals with the findings of all relevant field investigations and makes necessary recommendations on the suitable type of foundations to be adopted for this project.

This report presents the, soil profile and other related graphs, curves etc. based on field test only and their analysis thereof , the most suitable type of foundations recommended thereof.

For Artisan Engicon Pvt. Ltd.

Director

2.0 FIELD INVESTIGATION

The site condition and general nature of at the terrain at the time of conducting field investigation is as follows.

Serial No.	Site ID	Name of site	Type of terrain	Remarks
1.	-	Butberia - Mihijam	Flatto moderate	

- Borehole has been sunk at specified location.

2.1 BORING

All the bore holes at specified locations, were sunk by deploying Soil Boring Manually Operated Augur Equipment of Dia 150 mm. Methodology followed for boring confirmed to IS:1892 - 2000. Boring was progressed by the cutting action of augur up to required depth .The details of strata and depth of boring has been mentioned in respective sections.

2.2 SAMPLING

Disturbed & undisturbed samples were taken at 1.5m intervals or change of soil strata or wherever possible to examine physically the nature of the representative strata. These were collected from the auger and the barrel of the split spoon sampler after the standard penetration tests.

2.3 IN-SITU TEST

Standard Penetration Test:-

Field test to determine "penetration resistance of soil" has been conducted in the bore holes at regular interval as per procedures described in IS: 2131 in each borehole using a split spoon sampler. The split spoon sampler used for this test advanced by driving with a monkey weighing 63.50 kg falling freely through 750mm. The sampler was driven 450mm with equal three marking in the drill rod and the nos. of blows was recorded. No. of blows for the driving of last 300mm was considered as N- value. The soil specimens collected from the split spoon samples were preserved in polythene bags for logging purpose.

For Artisan Engicon Pvt. Ltd.

Director

3.0 SOIL PROFILE &FIELD TEST REPORT

The Strata Details are as below-

Depth below GL. (in Meter)		Soil Description	N-Value	Core Recovery	RQD
From	To				
0.00	1.50	Brown – gray to whitish grayish medium grained Sandyclay mixed with kankar, pebble stone pieces etc.	27	-	-
1.50	3.00		36	-	-
3.00	4.50		40	-	-
4.50	6.00		>50	-	-

For Artisan Engicon Pvt. Ltd.

4.0 SBC CALCULATION AND RECOMENDATION:-

Bearing capacity analysis for open foundations has been done in accordance with **IS: 6403-1981**(Code of practice for determination of bearing capacity of shallow foundations)based on field tests.Settlement analysis has been performed in accordance with **IS: 8009 Part-1-1976.** (Code of practice for calculation of settlements of foundations)

When a foundation slab is placed over a bed of cohesion less soil like sand, gravelly sand or pebble and cobble with sand, clayey sand or silty sand infill, the allowable soil pressure or Safe bearing Capacity of soil from both Shear and settlement point of view can be determined directly.

Peck, Hansen and Thornburn in their book "**Foundation Engineering**", have developed a single formula in finding out allowable soil pressure. They have prepared a chart co-relating the **N-Value** and Width of foundation for 25 mm settlement. They have found that the allowable soil pressure decreases with increasing in foundation slab width, but beyond the width of 6 mtr. there is no any decrease. Raft foundation with heavy continuous beam and slab covering combined footing and raft slab can undergo almost twice the settlement i.e. 50 mm as against isolated footing. Based on this fact, they have evolved the following simple expression for determining the allowable soil pressure –

q = (N-3)/5 Kg/Cm^2 (for 50 mm settlement)

Therefore, For 25 mm settlementallowable soil pressure will be –

q = 25/50 x (N-3)/5 Kg/Cm^2

= (N-3)/10 Kg/Cm^2 Where N = Design SPT Value

Design SPT Value (N)can be found from observed SPT Value after applying the Dilatancy Correction for fine sand and silt below water table.

Dilatancy correction = 15 + 0.5 {N -15} (Where SPT must be >15)

For Artisan Engicon Pvt. Ltd.

Director

- **Calculation of SBC for present site at founding level (2.5m - 3m) below OGL-**

Observed SPT Value (Avg.) = (27+36)/2 = 31.5

Apply delitancy correction for Design SPT value –

N = 15 + 0.5 (N-15)

= (N.A.) not a fine sand or silt

Safe Bearing capacity –

q = (N-3)/10 Kg/Cm^2

= (31.5 – 3)/ 10 Kg/Cm^2

= 2.85 Kg/Cm^2

Assuming fully saturated condition on rainy season applying water table multiplying factor 0.5 on calculated SBC, taking submergence effect of cohesion less soil into consideration -

SBC = 0.5 x2.85Kg/Cm^2

= 1.425Kg/Cm^2

= 14.25Tonnes/Sqm

Say -14.00Tonnes/Sqm

So, the Recommended Safe Bearing Capacity (SBC) is 14.00Tonnes /Sqm at the depth of 2.5 to 3.0 m below Ground Level.

For Artisan Engicon Pvt. Ltd.

Director

Notes

- It has been assumed that the water table will rise to 1.5m below the ground level in the peak rainy season
- The depth of embedment of foundation has been given from the existing ground level at the time of our investigation, any cutting or filling at that point should be adequately taken care.
- No foundation should be placed in filling.
- Due consideration should be given to stress overlaps
- It should be insured that the foundation should rest either on soil or rock but not partly on rock and partly on soil to restrict differential settlements
- The slope of foundation at the time of excavation may be kept at 90 degree
- The report is valid for a reasonable time from the date of issuance, after the passage of long period of time, the site conditions or the nature of soil may change requiring fresh investigation.
- Total settlement of the foundation bearing on soil is expected to be 25 mm for sand and 40 mm for clay
- In areas adjoining to canal, pond puddles etc. and on slops of low lying areas/ hills slopes, proper care should be taken prior to placing the foundation.
- Sand filling if required, should be done within permanent lateral confinement and covering the area corresponding to dispersion of load. This sand filling should be done in layers not exceeding 150 mm in thickness, compacting the same by saturation with water and ramming by proper means complete.

Artisan Engicon Pvt.Ltd

For Artisan Engicon Pvt. Ltd.

Director

(Authorized Signatory)