

PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT

PROPOSED
MULTI-SPECIALITY/ SUPER SPECIALITY HOSPITAL
UNDER NON-BRGF
AT ASANSOL

Date : 17/10/2014

ALLOWABLE BEARING PRESSURE CALCULATION

Shallow Foundation

(a) *Bearing Capacity Analysis for shallow foundation*

The net ultimate bearing capacity (q_{ult}) of shallow footings as per I.S.Code (I.S.6403-1981) is given by the equation:

$$q_{ult} = C_u \cdot N_c \cdot s_c \cdot d_c \cdot i_c + s(N_q - 1) s_q \cdot i_q \cdot d_q + (1/2) B \cdot \gamma \cdot N_\gamma \cdot s_\gamma \cdot d_\gamma \cdot i_\gamma \cdot W'$$

$$q_{ult} = C_u \cdot N_c \cdot s_c \cdot d_c \cdot i_c \text{ \{For } \phi = 0, \text{ Cohesive Soil}\}}$$

where $N_c = 5.14$ (For, $\phi = 0$)

N_c, N_q, N_γ = Bearing capacity factors (As per I.S.6403-1981)

s_c, s_q, s_γ = Shape factor.

d_c, d_q, d_γ = Depth factor.

i_c, i_q, i_γ = inclination factor.

γ = Bulk unit weight of sub-soil.

W' = Correction factor to account for the effect of water table.

σ = Effective surcharge at the base level of foundation.

B = Width of footings

L = Length of footings

D_f = Depth of foundation

C_u = Undrained shear strength (From Laboratory Test)

N = SPT Values related to consistency of Clay Soil

ϕ = phi (From Field / Laboratory Test)

(b) Settlement for shallow foundation

Settlement=Immediate Settlement +Consolidation Settlement

$$S_f = S_i + S_c$$

$$S_i = q_{net} B^* \{ [1 - \mu^2] / E_s \}^* I_f$$

q_{net} = Net foundation pressure/Intensity of contact pressure

B = Width of footing

E_s = Undrained Modulus of elasticity of soil

μ = Poisson's Ratio of soil

I_f = Influence coefficient, a function of ratio of length to width of footing=1.12

$$S_c = m_v \cdot \Delta p \cdot H$$

m_v = Coefficient of volume change/compressibility.

Δp = Pressure increment due to foundation loading

$$= (L \times B \times P) / \{ (L + H/2)(B + H/2) \}$$

H = Thickness of the stratum.

(c) Data Required & Obtained from Laboratory & Field Test Results

$C_u =$	2.70	T/m^2
$\gamma =$	1.80	T/m^3
$\phi =$	0	$^{\circ}$

Allowable Bearing Pressure

Sl. No.	Types of Footing	Footing Size (m x m)	Depth of footing below E.G.L. (m)	Net Safe Bearing Capacity (T/m^2)	Allowable Bearing Pressure ((T/m^2))	Max. Permissible Settlement(mm)
1	Square	1.2 X 1.2	1.5	9.02	9.0	75
2	Square	1.5 X 1.5	1.5	8.66	8.7	75
3	Square	2.0 X 2.0	1.5	8.30	8.3	75
4	Square	2.5 X 2.5	1.5	8.08	8.1	75
5	Square	3.0 X 3.0	1.5	7.94	7.9	75
6	Rectangular	1.5 X 2.5	1.5	7.46	7.5	75
7	Rectangular	2.0 X 3.0	1.5	7.24	7.2	75
8	Rectangular	2.5 X 3.0	1.5	7.25	7.3	75
9	Strip ($L/B \leq 5$)	1.5 m wide	1.5	6.93	6.9	75
10	Strip ($L/B < 5$)	2.0 m wide	1.5	6.64	6.6	75
11	Strip ($L/B < 5$)	2.5 m wide	1.5	6.47	6.5	75
12	Strip ($L/B < 5$)	3.0 m wide	1.5	6.35	6.4	75

GEOTECHNICAL INVESTIGATION FOR PLANNING, DESIGN AND EXECUTION OF MULTI-SPECIALITY/ SUPERSPECIALITY HOSPITAL UNDER NON-BRGF

Site: Asansol Sub-Divisional Hospital, Asansol, Dist-Burdwan

Method of Boring : Shell & Auger Ground Elevation: E.G.L.

Diameter of Boring : 150 mm Depth of Borehole : 4 m Date of Commencement : 30.09.2014

Water Stuck : - Depth of Casing : - Date of Completion : 01.10.2014

SAMPLE DETAILS							Thickness/Depth of Layer(m)	DESCRIPTION
Type	DEPTH(M)		SPT: No Blows					
	From	To	0-15 cm	15-30 cm	30-45 cm	N' Value		
	0.00						3.50	Soft to Medium Reddish Grey Silty Clay/Clay Silt with Traces of mica.
DS	0.50							
DS	1.00							
SPT	1.50	1.95	1	1	2	3		
UDS	2.00							
	2.50							
SPT	3.00	3.45	2	2	3	5	5.00	Hard Whitish Yellow/ Yellowish Sand Stone Very Severely weathered disintegrated into fragments of silty sand.
	3.50							
SPT	4.00	4.45	18	52		52		
SPT	5.00	5.45	55			>50		

UDS : Undisturbed Sample (U) 01

CS : Core Sample (C)

DS : Disturbed Sample (D) 05

WS: Water Sample (W)

SPT : Standard Penetration Test (P) 03

VS : Vane Shear Test (V)

GEOTECHNICAL INVESTIGATION FOR PLANNING, DESIGN AND EXECUTION OF MULTI-SPECIALITY/
SUPERSPECIALITY HOSPITAL UNDER NON-BRGF

Site: Asansol Sub-Divisional Hospital, Asansol, Dist-Burdwan

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SPT	1.50	1.95	1	1	2	3		
UDS	2.00							
	2.50							
SPT	3.00	3.45	1	1	2	3		
	3.50						5.00	Hard Whitish Yellow/ Yellowish Sand Stone Very Severely weathered Disintegrated in to fragments of silty sand.
	4.00							
SPT	4.50	4.95	24	51		51		
	5.00							

UDS : Undisturbed Sample (U) 01

CS : Core Sample (C)

DS : Disturbed Sample (D) 05

WS: Water Sample (W)

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SITE PLAN SHOWING LOCATION OF BOREHOLES AT SITE
ASANSOL SD HOSPITAL, ASANSOL DIST-BURDWAN

