PHETHOGO CONSULTING (BLOEMFONTEIN)

GEOTECHNICAL REPORT FOR THE PROPOSED TOWNSHIP DEVELOPMENT AT WARDEN, FREE STATE

GEOTECHNICAL INVESTIGATION

REFERENCE : SL / 1436 **Document No.: 2012/243/Doc.** **MARCH - 2013**

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Table 4: *Potential Heave and NHBRC Classification

Test Pit No.	Depth of Layer (mm)	Potential Heave (mm)	Classification (NHBRC)
TP1, TP2, TP3, TP4, TP5, TP6, TP8, TP10, TP11, TP12, TP13, TP15, TP19, TP20, TP31, TP32, TP33, TP34, TP35, TP36 TP37, TP38	Total soil profile	Low	H
TP7	400 - 700	Medium / 4.8	
TP9	300 - 700	Medium / 6.3	
TP14	500 - 1200	Medium / 9.1	H1
TP22	300 - 700	Medium / 11.8	
TP16	400 - 1700	Medium / 15.5	H2
TP21	1100 -2750	Medium / 29.9	

8.3 Potentially Compressible Soils

Potentially compressible clay layers occur in the profiles of TP7, TP9, TP14, TP16, TP21 and TP22.

8.4 Ground Water Seepage or Level

No ground water seepage or water table was encountered in any of the test pits at the time of the investigation.

8.5 Slope Stability (Steep Slopes & Unstable Natural Slopes)

No steep fill or unstable natural slopes occur over the proposed development area.

8.6 Erodibility of the Soil Profile

The only evidence that erosion had taken place or is occurring is the donga at test pit location 23 and 24.

8.7 Excavatibility

Excavations during the investigation showed that the soil covering the bedrock can be excavated with ease by means of pick and shovel or TLB excavator.

The soil can in general be excavated at a rate of 0.4m³/min by means of a TLB.

The bedrock may require power equipment and in some cases blasting for excavations may be necessary.

8.8 Aggressiveness of Soil

The conductivity and pH of selected soil types were determined to estimate the aggressiveness of the soil.

Based on the results the soil in general is corrosive to very corrosive. Precautionary measures may be necessary with regards service materials.

The result of this exercise is summarised in the following table.

Table 5: *Aggressiveness of Soil

Test Pit No.	Layer (mm)	Description	pH	Conductivity (Sm^{-1})	Aggressiveness
TP2	0 - 600	Sand	6.60	0.263	Very corrosive
TP6	0 – 700 700 – 1000	Sand Silty clay & ferricrete	5.95 8.90	0.204 0.321	Very corrosive Very corrosive
TP7	400 - 700	Clay	8.45	0.438	Very corrosive

Test Pit No.	Layer (mm)	Description	pH	Conductivity (Sm^{-1})	Aggressiveness
TP8	1000 - 1700	Sandstone	7.32	0.369	Very corrosive
TP9	300 - 700	Clay	8.13	0.534	Very corrosive
TP11	300 - 1400	Sandy clay	7.13	0.291	Very corrosive
TP13	0 - 600	Sand	7.01	0.282	Very corrosive
TP14	500 - 1200	Sandy silty clay	6.78	0.398	Very corrosive
TP16	400 - 1700	Ferricrete	7.65	0.291	Very corrosive
TP20	500 - 800	Clayey sand	6.77	0.379	Very corrosive
TP21	0 - 500 500 - 1100 1100 - 2750	Sand Sandy clay Sandy clay	6.37 7.51 7.82	0.311 0.243 0.505	Very corrosive Very corrosive Very corrosive
TP22	300 - 700	Clay	7.36	0.243	Very corrosive
TP32	1100 - 1600	Mudstone	6.59	0.282	Very corrosive
TP35	500 - 900	Clay & ferricrete	7.04	0.165	Corrosive

8.9 Bearing Capacity

The estimated bearing capacity (kPa) based on DCP tests are given in Appendix E.

Note that the DCP results are only valid for the time when the DCP measurements were taken and will vary as the moisture content of the soil varies.

9.0 Infrastructure – Roads and Streets

The Colto classification of the sandy topsoil is G7 and is suitable as selected layer material in streets or roads.