

3. LABORATORY TESTING

For proper identification and classification of the sub-soil deposits and for deriving adequate information regarding its relevant physical and geotechnical properties at the site under investigation, the following laboratory tests were conducted on the soil / rock samples collected from the exploratory bore holes:

On Soil Samples:

1. Grain size analysis (Sieve as well as Hydrometer).
2. Determination of Liquid Limit, Plastic Limit and Shrinkage Limit.
3. Determination of Natural Moisture Content.
4. Determination of Specific Gravity.
5. Determination of Bulk & Dry Unit Weight.
6. Strength determination by Triaxial Unconsolidated Undrained Test (UU).
7. One-dimensional Consolidation Test for determining settlement potentiality.
8. Determination of Free Swelling Index & Swelling Pressure.
9. Conducting Standard Proctor Compaction Test to determine Optimum Moisture Content (OMC) and Maximum Dry Density (MDD).
10. Conducting CBR test (soaked) on sample prepared at 95% of MDD.
11. Chemical tests on soil and water samples to determine pH value, Sulphate, Chloride content etc.

On Rock Samples:

1. Determination of Bulk Density, Water Content, Specific Gravity & Porosity of Rock.
2. Determination of Unconfined Compressive Strength of Rock samples (Saturated & In-situ State).
3. Determination of Point Load Strength Index.
4. Determination of Slake Durability Index of Rock.
5. Determination of Hardness, Soundness and Deformability both at saturated and in-situ water content.

Laboratory test results are presented in a tabular form in the Appendix. The results are self explanatory excepting that of consolidation tests. The compressibility for a pressure range has been separated into 2 components through the compression ratio. As a first step dial gauge reading is plotted against square root of time and by extrapolation dial reading at zero time, is obtained. The compression ratio is given as

$$r = (d_i - d_s) / (d_i - d_f), \text{ where}$$

d_i = Initial reading of dial before load application

d_s = Dial reading corresponding to theoretical zero time

d_f = Final dial reading after 24 hrs.

Now we write $m_{vc} = (1 - r) \times m_v$

All the tests were conducted as per relevant Indian Standard Specifications.