

METHOD STATEMENT FOR GEOTECHNICAL INVESTIGATION



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SOIL INVESTIGATION

01) PURPOSE

The purpose of this document is to establish a documented procedure for soil investigation when required as per contract conditions.

02) SCOPE

This procedure shall be applicable to all construction projects. Disturbed and undisturbed samples were to be collected from all boreholes to assess the soil characteristics in laboratory.

Conducting Standard Penetration Tests at regular interval of 3.00 m as per IS specifications and as per the direction of Engineer – in –charge during boring operation. Collecting disturbed / undisturbed soil samples from the borehole at regular interval as per IS specifications and as per the direction of client during boring operation based on the strata met with Relevant laboratory tests were planned on collected undisturbed / disturbed soil samples to determine the required engineering properties of the soil strata met at the site. Chemical analysis of soil and ground water to determine pH, S03 & CI contents to decide any precautionary measures for protecting foundation concrete and reinforcement, as per IS-2720 (part-26) and IS-3025 (Part 24 and 32).

03) METHODOLOGY OF INVESTIGATION

- 📌 The investigation was planned to obtain the subsurface stratification in the proposed project area and collect soil samples for laboratory testing to determine the engineering properties such as shear strength, along with basic engineering classification of the subsurface stratum to arrive at the foundation design parameters.
- 📌 For Geotechnical investigation work, boring rig was installed at the specified bore hole location. Stability of rig was ensured by making level ground. Boring was advanced by shell & auger method and sampling were carried out at regular in the borehole.
- 📌 The rig deployed was suitable for and had arrangement, boring, conducting Standard Penetration Test (SPT), collection of Undisturbed Soil Sample (UDS) and Disturbed (DS).

04) Standard Penetration Tests (SPT)

Standard Penetration Tests (SPT) were conducted at different depths in these boreholes. SPT split spoon sampler of standard dimensions was driven into the soil from the borehole bottom using 63.5 kg Hammer falling from 75 cm height. The SPT weight was mechanically lifted to the specified height and allowed to fall freely on the anvil with the use of cat-head winch with one to one and half turn of the drum. The efficiency of the SPT blows is expected to be 65 to 75% in this system, and can be directly used in most of analyses involving “N” values. Blow counts for the penetration of every 15 cm was recorded and the N is reported as the blow counts for 30 cm penetration of the sampler leaving the first 15 cm penetration as seating drive.



When the number of blows exceeded 50 to penetrate the first or second 15 cms length of the sampler, the SPT N is regarded as more than 100 as described in IS 2131 - 1981. The test is terminated in such case and a record of penetration of the sampler under 50 blows is made. SPT refusal is recorded when there is no penetration of the sampler at any stage and also when a rebound of the sounding system is recorded. These tests were conducted at close intervals of 1.5m at shallow depths so that a continuous SPT N profile is available.

05) Disturbed Sampling in boreholes

- Disturbed soil collected in the SPT sampler was preserved in polythene covers and transported to the laboratory. One more polythene cover was provided to prevent the loss of moisture during the transit period.

06) Undisturbed Sampling in Boreholes

- Undisturbed samples were collected using 100mm dia and 450mm long MS tubes provided with sampler head with ball check arrangement. At few locations and depths, the sampling tubes could not be pushed / driven into the soil because of hard consistency at few locations and at certain depth samples slipped.
- The laboratory testing was done following the testing procedures given in the relevant parts of IS-2720.

07) In Situ Permeability Test

- In rocky strata, Packer tests is conducted in accordance with IS : 5529 Part 2. The hole is drilled to the desired depth, and cleaned. Two packers connected to the ends of a perforated drill rod of length equivalent to the test section are fixed in the bore hole.
- Water is then pumped under increasing pressures of 0.1, 0.2 and 0.3 kg/sq cm. and then decreasing pressure. Each pressure is maintained until the readings of the water intake at 5 m intervals show constant values. Lugeon values are computed for each test section. They are interpreted as per Table 1 of IS : 5529

08) FIELD AND LABORATORY TESTS AND DATA OBTAINED

GENERAL

In order to ascertain the in-situ subsoil profile and to determine the relevant Geotechnical parameters, both field and laboratory tests were carried out. The field programme consisted of Boring, Standard Penetration tests and sampling of representative and undisturbed soil samples from Boreholes. Both representative and undisturbed samples were brought from field to the laboratory and test like Atterberg's limits, Sieve Analysis, Natural Moisture Content, Shear test etc. were conducted on these samples.

BORING AND SAMPLING

Two Boreholes were advanced at the site of ROB location, representative samples were collected. The maximum depth upto which a borehole drilled was 30.00 m. The field borelogs for all boreholes / laboratory test results / SPT curves and correction tables is presented in this report.

STANDARD PENETRATION TEST

Standard Penetration tests are conducted along with the boring operation. Overburden and dilatancy corrections have been applied in non-plastic & non cohesive soils as applicable.

WATER TABLE

Ground water table was encountered at different depths at different structure locations, and has presented in field bore logs of boreholes at every structure location.

CLASSIFICATION TESTS

Sieve analysis and wherever necessary, Atterberg Limit Tests were conducted on representative samples obtained from the bore holes. Based on the result of these tests, soil samples were classified as per IS: 1498-1970. The classification is shown in the bore logs report.

NATURAL MOISTURE CONTENT & NATURAL DENSITY

Natural moisture contents / density of soil samples from the boreholes at different depths were measured in the laboratory and the values are indicated in laboratory test results.

SPECIFIC GRAVITY

The specific gravity of soil grains was found by the pycnometer procedure and results.

DIRECT SHEAR TEST

Direct Shear Tests were conducted on selected undisturbed soil samples / remoulded samples.

TRI-AXIAL TEST

TRIAXIAL Shear Tests were conducted on selected undisturbed soil samples / remoulded samples.



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