
	<b>ENAS Technical Requirement for Soil Testing – Soil Investigation Laboratories</b>		<b>ID. No. : ETR 05</b>
	<b>Revision No: 00</b>	<b>Revision Date: 11-08-2014</b>	<b>Page 1 of 8</b>

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## 1. Purpose

The purpose of this document is to establish specific technical requirements for the accreditation of all conformity assessment organizations active in the field of geotechnical investigations and soil analysis.

## 2. Scope

The requirements stipulated in this document cover complete site investigation and analysis including adequate program of field sampling, laboratory testing, and engineering analysis and evaluation, with the results presented in report form.

## 3. Definitions

### 3.1 Geotechnical investigation:

The process of assessing of site- suitability for the construction of civil engineering and building works and of acquiring knowledge of the characteristics of a site that affect the design and construction of such work and the security of neighboring land and property. The stages of Geotechnical investigations include:

- Planning
- Drilling, sampling and in-situ testing
- Laboratory testing (as described in Annex A)
- Results commissioning and report writing

### 3.2 Geotechnical Laboratory:

Laboratories legally licensed to perform geotechnical testing and is to be accredited according to ISO/IEC 17025.

### 3.3 Geotechnical Consultants

Companies legally licensed of having capabilities of conducting complete geotechnical investigations including planning, drilling, sampling and in-situ testing, laboratory testing results commissioning and report writing and is to be accredited against ISO/IEC 17025 or ISO/IEC 17020 or both. The consultants can subcontract the laboratory testing to accredited laboratory.

### 3.4 Classification of Scope:

**Class 1:** Companies/ laboratories which are legally licensed to perform geotechnical investigations and conduct all the stages of the investigation as defined below. Such companies are to be accredited for the minimum scope as given in Annex A including sampling and

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interpretation of results according to the requirements of the international standard ISO/IEC 17025 and /or ISO 17020 or both.

- Planning
- Drilling, sampling and in-situ testing
- Laboratory testing according to Annex A
- Results commissioning and report writing

**Class 2:** Companies which are legally licensed to perform geotechnical investigations and conduct all stages of geotechnical investigation except for testing capabilities as given in Annex A. These are to be accredited according to ISO/IEC 17020 and their scope shall include sampling and interpretation of testing results. They can sub-contract testing part to accredited testing laboratories.

- Planning
- Drilling, sampling and in-situ testing
- Results commissioning and report writing


**Class 3:** Test laboratories which are legally registered for conducting testing (geo technical) and are accredited according to ISO/IEC 17025. The lab will not be responsible for sampling and/or interpretation of results in their scope of accreditation.

- Laboratory testing

## **4. ENAS Requirements**

### **4.1 Introduction**

- 4.1.1 These are the technical requirements for the accreditation of site sampling for soil analysis and geotechnical investigations.
- 4.1.2 Laboratory are required to seek accreditation for minimum number of specific scopes as defined in Annex A
- 4.1.3 All CABs shall have professional liability/indemnity insurance based on appropriate risk analysis and shall be according to the UAE legislative regulations
- 4.1.4 Assessment, reassessment, and surveillance will be conducted on site as well as in the laboratory.

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#### 4.2 Quality System

4.2.1 The Quality Manual (QM) for the laboratory shall include all aspects of operation of site sampling.

#### 4.3 Review of Quality Management

4.3.1 The QM shall contain or refer to documented detailed procedures for the regular audit and review of the quality system for sampling carried out on site.

4.3.2 The Quality Manager for the laboratory or his deputy shall visit sites as part of the audit and review program.


#### 4.4 Personnel

4.4.1 Approved Signatories with responsibility for the operation of the accredited test should have the necessary qualification, experience and technical knowledge to ensure that clients, test standards and ENAS requirements are met. In this regard, the persons shall satisfy the following minimum qualification and experience requirements:

Option 1:	Be in possession of at least a University degree for civil, geotechnical or geological discipline, and have a minimum of five years of post-qualification civil or geotechnical engineering experience, with at least one year of experience in supervising the relevant types of soil and rock tests.
Option 2:	Be in possession of a Polytechnic or Institute of Vocational Education Ordinary Certificate in Civil Engineering, or equivalent, and have a minimum of seven years of post-qualification experience in construction materials testing, with at least two years in the relevant types of soil and rock tests, one year of which shall be in a supervisory role.
Option 3:	Be in possession of the Emirates Certificate of <u>secondary</u> Education Examination, or equivalent, and have a minimum of ten years of post-qualification experience in construction materials testing, with at least two years in the relevant types of soil and rock tests, one year of which shall be in a supervisory role.

4.4.2 All drilling, sampling and on site testing activities must be supervised by trained and authorized personnel who have demonstrated technical competence during an on-site assessment by ENAS.

4.4.3 The laboratory shall have procedures for ensuring that staff deployed for sampling on site are properly trained and proficient in their assigned functions. All personnel performing accredited site sampling shall be included in the staff training and competence assessment records.

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**4.4.4 Personnel responsible for reporting and supervising/managing site activities) shall undergo professional training approved by ENAS and if needed personnel certification programs accredited by ENAS in future.**

#### 4.5 Equipment

- 4.5.1 There shall be procedures for operating, maintaining and calibrating equipment used for site sampling. All equipment used for site sampling shall, when practicable, be uniquely and indelibly identified.
- 4.5.2 In addition, precautions shall be taken to ensure that after transportation to site, the sampling equipment remains in a serviceable state and in calibration.
- 4.5.3 Appropriate checks shall be performed on site to confirm calibration status before sampling commences. Where such checks cannot be made on site, calibration status should be checked in the laboratory before and after site sampling. If equipment is found to be unfit for use and/or out of calibration, it shall not be used and shall immediately be withdrawn from service.
- 4.5.4 All drilling accessories shall be permanently coded and made traceable to the related drilling rig.
- 4.5.5 Drilling rigs and wire ropes in particular shall be inspected by accredited third party inspector at least once per year. Inspection reports shall be retained.

#### 4.6 Calibration

- 4.6.1 Where it is necessary to use reference standards on site, adequate precautions shall be taken to ensure that the required calibration status is maintained during transportation and while on site. Reference standards shall be maintained in a suitable environment at all times.
- 4.6.2 Site sampling equipment shall be labelled or otherwise identified to indicate its calibration status. The information concerning any corrections found to be necessary as a result of calibration and the record of routine function check on equipment shall be available on site.
- 4.6.3 Verification of the weight of SPT hammer, weight and dimensions of spoon sampler and drive assembly and dimensions of drive show, split barrel, coupling and drive assembly shall be made every 6 months and records shall be retained.

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#### 4.7 Sampling Methods and Procedures

4.7.1 Site sampling procedures shall be available to all staff performing sampling on site.

4.7.2 The laboratory shall use sampling procedures that are up-to-date and, wherever possible, established as standard. Where other procedures have to be adopted, they shall be validated. The validated procedures shall be documented.

4.7.3 Information obtained from site sampling shall be identified as such on forms issued by the laboratory. Such sampling forms shall in addition to information required in the standard, also contain the following minimum information:

- a. unambiguous identification of sample - this shall include site location, identity of sample, sample condition, and any other relevant details such as location of sample on site;
- b. date of site sampling;
- c. details of environmental conditions for site sampling where appropriate;
- d. signature of authorized signatory in the laboratory accepting technical responsibility;
- e. any abnormalities or departures from documented procedures during site sampling.
- f. requirements for reporting as stipulated in the relevant sampling standards (if any).

4.7.4 Subcontracting of laboratory tests shall be made to accredited laboratories only.


#### 4.8 Environment

4.8.1 The environment in which the sampling is undertaken shall meet all sampling procedure requirements so as not to adversely affect the quality of samples.

4.8.2 Where sampling is undertaken in a hostile environment, there shall be provisions to ensure that the environment does not adversely affect the validity of the test to be done on the samples obtained. Any deviations from the environmental requirements of sampling procedures shall be recorded.

#### 4.9 Handling of Samples

4.9.1 Precautions shall be taken during storage, handling and mounting to prevent damage to samples.

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4.9.2 All samples taken shall be uniquely identified. The date, time, location, environmental conditions of sampling, identification of the person performing the sampling and any other relevant information shall be recorded.

#### 4.10 Records

4.10.1 Procedures shall exist for recording and reporting all sampling details on site.

4.10.2 The details of site sampling (including all original observations and raw data obtained) shall be recorded on the spot in proforma worksheet or logbook, which shall be signed by the person performing the sampling after completion of the sampling.

4.10.3 Procedures shall exist for ensuring commercial confidentiality and security of samples held on site.

4.10.4 Reports, interpretations and bore hole logs shall comply with the requirements of the International Standard BS 5930 or equivalent ASTM method.

4.10.5 Reports issued by accredited laboratories and geotechnical consultants/engineers shall have the accreditation logo as per the accreditation logo requirements issued by ENAS.

#### 4.11 Outside Support Services and Supplies


4.10.1 The laboratory shall provide and operate necessary quality control procedures, including inspection; calibration and verification etc., to ensure that all site sampling equipment supplied by and/or borrowed from another party is of adequate quality and has proper measurement traceability before use.

#### 4.12 Access to Sites

4.12.1 ENAS staff and assessors shall be allowed to access the sampling sites. When the site is controlled by another party, the laboratory shall negotiate access for ENAS representatives to the appropriate parts of the site.

#### 4.13 Health, Safety and Environment

4.13.1 All organizations shall comply with the safety requirements issued by regulatory authorities

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## Annex A

<b>1</b>	*Soil penetration test (SPT)
<b>2</b>	Soil sampling
<b>3</b>	Ground water level management
<b>4</b>	Ground water sampling
<b>5</b>	Soil and Rock description

### Chemical tests

<b>6</b>	Acid soluble sulphate content of soil
<b>7</b>	Water soluble sulphate content of soil
<b>8</b>	Acid soluble chloride content of soil
<b>9</b>	Water soluble chloride content of soil
<b>10</b>	pH of soil
<b>11</b>	pH of ground water
<b>12</b>	Sulphate content of ground water
<b>13</b>	Chloride content of ground water

### Classification of tests

<b>14</b>	Particle size distribution
<b>15</b>	Determination of water (moisture) content of soil and rock by mass.
<b>16</b>	Liquid limit, plastic limit, and plasticity index of Soils
<b>17</b>	Hydrometer

### Core

<b>18</b>	Unconfined compression test
<b>19</b>	Rock quality designation
<b>20</b>	Core recovery
<b>21</b>	Preparation of rock core
<b>22</b>	Reporting

**\*For SPT if needed a non-standard method can be used, provided the method is formally validated.**