



TOR – BATCH3 – WASTE
WATER TREATMENT
MODULE
TOR

ABSTRACT

Brief Specifications of the Systems to be installed in Minjez Akkar for the Water Treatment Modules as per UNICEF concept Design – September 2021

Akkar Base

A - EARTHWORK (GENERAL)

1- Description

This work shall consist of clearing and grubbing, stripping, removal of unsuitable soil, excavation, fill and backfill, and other specified works related to the earthwork.

2- General Requirements

Prior to any excavation in the field, a license request together with all detailed drawings showing the locations of the excavations and a written commitment to restore the land to its initial condition shall be submitted to the Engineer and the Municipality. Excavation shall not commence without written approval from the Municipality.

The Contractor shall not start any earthwork before getting the Engineer's approval on the cross sections. The Contractor shall ensure that there are no pipes, cables, mains or other services or property which may be disturbed or damaged by its use. He will take all precautions not to damage these services and restore these services if damaged on his own expense.

The contractor shall have a technical land surveyor to make all necessary levelling and benchmarks and to ensure the right invert levels as per design drawings.

The Contractor shall submit the as built site level before and after the excavation as Soft copy (ACAD copy).

3- Clearing & Grubbing

This work shall consist of clearing, grubbing, removing and disposing of all vegetation and debris within the limits specified. This work shall also include the preservation from injury or defacement of all vegetation and objects designated to remain.

The areas to be cleared and grubbed shall be as shown on the Plan, as designated or as directed by the Engineer. The Engineer will designate all trees, shrubs, plants and other things to remain. The Contractor shall preserve all things designated to

remain. Before carrying out work, the Site shall be inspected by the Contractor in conjunction with the Engineer to establish its general condition which shall be agreed and recorded in writing, and where in the opinion of the Engineer it is deemed necessary, by means of photography.

Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled with suitable material and compacted to 90% of Maximum Dry Density.

Topsoil shall mean the surface layer of soil which by its humus content supports vegetation and is unsuitable, as a formation to roads and concrete structures or as a backfill or bedding material. The extent and depth of topsoil that needs removal shall be agreed with the Engineer.

Topsoil shall be set aside for re-use or disposal off site as directed by the Engineer. Trees to be removed shall be uprooted or cut down as near to the ground level as possible. Bushes, undergrowth, small trees, stumps and tree roots shall, where directed by the Engineer, be grubbed out. All holes left by the stumps or roots shall to backfilled with suitable material (Aggregate Base Course with Fine Materials) in a manner approved by the Engineer.

Materials arising out of site clearance shall be disposed by the Contractor off the Site, or where approved by the Engineer on the Site in a manner and place approved by the Engineer.

The Engineer may require that individual trees, shrubs and hedges are preserved and the Contractor shall take all necessary precautions to prevent their damage.

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B- CONCRETE WORKS

1- Description

Concrete shall consist of a mixture of cement, water and aggregates without air-entraining or water-reducing admixture unless specified otherwise.

Precautions are required to minimize the risk of alkali aggregate reaction. The Contractor shall demonstrate the adequacy of his proposals when he supplies details of his mix design. Unless otherwise agreed, when calculating the cementitious alkali contribution the maximum cement content in the schedule shall be used.

2- Cement

The types of cement to be used are in general: cement type sulfate resisting cement type P-RMS or P-RSS for concrete exposed to sulfate attack.

The cement classes should be as defined by the Lebanese norms LIBNOR. However the Engineer has the right to impose the use of any type of cement in any type of concrete and in any structure according to the concrete exposure and other conditions.

3- Tests and Acceptance

Cement shall be tested for conformance with Lebanese Norms or AASHTO M 85 or British Standard 12 and shall have a compressive strength of standard cement mortar samples at twenty-eight (28) days of not less than two hundred fifty (350) kilograms per square centimeter.

All cement is subject to the Engineer's approval and shipments of cement shall be accompanied by a manufacturer's Certificate of Guarantee and/or laboratory test certificate.

The Engineer reserves the right to order a retest of the cement at any time. Approval of a cement quality shall not relieve the Contractor of the responsibility to fabricate concrete of the specified strength. The Contractor shall bear all costs in connection with the Certificates of Guarantee and laboratory tests. When tests of factory or field tests subsequent to the original approval tests show that the cement does not comply with the specifications, the entire consignment from which the sample was taken will be rejected and the Contractor shall immediately remove the rejected material from the site and replace it with cement, which meets the required specifications.

4- Strength

Strength of the ready-mix concrete must be **35 MPA**.

The characteristic strength of concrete means that value of the 28 day below which 5% of all possible test results would be expected to fall.

5- Execution Works

- 5.1- The contractor should build a manhole 2.40 x 2.40 x 2.40 m to be used as “Settler” to collect the wastewater coming from the existing 4-inch pipe network.
- 5.2- Construct a “Distribution Chamber” with a cover as per drawing #0; this chamber will receive the wastewater from the Settler and split the flow between both wastewater treatment systems.
- 5.3- Make a Concrete Pad 10 cm thick under the Steel Tank Module to be settled adequately and zero inclination tolerance as per drawing.

C- Installation Steps

- 6.1- Connect the distribution chamber to the Module-1 of each treatment systems.
- 6.2- Install a 2” ventilation pipes on the top of the second chamber of Module-1 for each system (dwg #1).
- 6.3- Connect Module 2 of each system using 4” pipes.
- 6.4- Assemble 6 Pre-filters as per drawing #2 using perforated 2” pipes rolled with luffa layers until it fits perfectly in a 4” Tee.
- 6.5- Insert 3 Pre-filters in the 3 corresponding tees in the second chamber of module 2 of each system.
- 6.6- Fill the 3rd chamber of module 2 of each system with filter media (bioblock or ecodepur – 150 to 200 m²/m³) inside plastic fishing net bags (around 60 Liters per bag) until reaching the required height of 85 cm.
- 6.7- Construct a chamber with 2 covers for each system as per drawing #3 and fix the tipping bucket inside.
- 6.8- Verify that the tipping bucket can rotate smoothly and there are no obstacles.

- 6.9- Verify that each tipping bucket is well centred in the chamber and test it with water coming from the module 2 of each system.

Each chamber distributes the water to two sand filters built using 8m³ tanks via a perforated 2” pipe branch as per drawing#4.

- The 1st layer is a 20 cm height fine sand (0.25-0.5 mm) ,
- The 2nd layer is a 40 cm height coarse sand (0.5-1mm),
- The 3rd layer is 20 cm height fine gravel (8-16 mm),
- The bottom layer is 40 cm coarse gravel (16-32mm).

The drainage is 4” perforated pipes and connected to 4 ventilation pipes as per drawing #5

D- FENCE WORKS

Put Fence around the system Green Color, Poles made from Galvanized Steel 2.6 m Height (50 cm embedded underground in RC foundations 50x50x50cm).



The project execution is not limited to this TOR and not limited to the mentioned tasks and specifications above and for any ambiguity and inquiry the contractor should referred to the Engineer by a written notice.