
SCHEDULE 1

DESCRIPTION OF THE WORKS

S1.1. GENERAL

- S1.1.1.** The Contractor shall ascertain all local conditions relevant to the Works and shall be completely responsible for the design, supply, erection and testing of the Plant including any civil engineering work within the battery limits. The Contractor shall also be completely responsible for the provision of the defined Services during the post construction Operation periods, together with the provision of all associated Documentation and Training. The Contractor shall do whatever is necessary to fulfill his obligations under the Contract and he shall also be responsible for all process licenses and similar agreements, thereby assuming responsibility for the process design and the performance guarantees.
- S1.1.2.** The drawings related to the Schedules are identified as Contract Drawings. Contract Drawings are the drawings originally provided as Volume 4 of the Tender documentation which have been annotated where necessary to reflect any changes accepted during the tendering/award processes and subsequently forming part of the Contract as the Contract Drawings.
- S1.1.3.** The Sewage Treatment Plant (STP) process shall be based on immersed hollow fibre membrane biological reactor technology (or an alternative as confirmed by the Purchaser in the Letter of Award which will subsequently be confirmed in the Contract).
- S1.1.4.** The civil, building and electrical supply works shall be provided for the complete 50,000 m³/d average flow Plant. Mechanical and certain electrical equipment shall be initially installed to deal with flows and loads from an average inflow of 37,500 m³/day (except where indicated otherwise below).
- S1.1.5.** The Contractor shall obtain in the name of the Purchaser all necessary permits related to the construction and operation of all the Facilities. The Contractor shall also be responsible, prior to Handover, for the renewal of operations permits which are required to be renewed annually such as the Permit to Discharge or Re-use Wastewater as required by the relevant authorities.

S1.2. LOCATION AND NATURE OF THE SITE

- S1.2.1.** The new STP shall be built on vacant land within the same Site as the existing Darsait STP in the Greater Mutrah Province (locally known as Wilayat) of Muscat Governorate. The existing STP site is located on the north side of Qurum Heights Highway close to Darsait Village. The location is shown on the Contract Design drawings and the Plant is known as Darsait STP. The latitude and longitude of the site is 23° 37' 18" and 58° 32' 16" respectively.

- S1.2.2.** The STP site is located close to residential areas located to the south and east of the site. Also immediately to the east of the site is a wadi and to the west a range of small jebels.
- S1.2.3.** The existing STP is located in the northern part of the site. The new STP shall be constructed in open ground in the unoccupied southern portion of the site as defined in the Contract Drawings. This area has been cleared under an earlier contract to be debris and vegetation free and levelled as indicated in the site layout drawing. The Plant shall be constructed within the designated site boundaries shown on the Contract Drawings. The Contractor shall however provide whatever additional clearance, excavation and filling works are required for the construction of the new STP. No additional land is available for the new STP beyond the battery limits defined in the Contract Drawings.
- S1.2.4.** During construction the Contractor shall provide adequate fencing and security to prevent any unauthorised access from the Site of the new STP onto the area of the existing STP. Due to the close proximity of some of the existing STP buildings to the Contractor's Site the fencing in such areas shall be of a solid type and of a height to prevent any possible danger to the STP operatives and the buildings from construction activities.
- S1.2.5.** The Contractor shall be aware that a graveyard is located just outside the southern boundary of the STP site and shall ensure that his activities and personnel recognise the need for due reverence to its existence.
- S1.2.6.** A geotechnical investigation of the site has been carried out and a copy of the report is provided to the Contractor for information purposes only. The Contractor shall take full responsibility, including undertaking any additional site investigations, for ensuring that the designs for all civil engineering elements of the Plant are appropriate for the prevailing ground conditions.
- S1.2.7.** The STP Site is on the edge of Darsait Wadi. Wadi refurbishment and flood protection works shall be undertaken by the Contractor.
- S1.2.8.** During the construction of the Plant dewatering activities shall be avoided if possible and shall only be allowed with the prior permission of the Project Manager. If the Contractor proposes such activities he will be responsible for providing a detailed method statement for the Project Manager's prior approval and obtaining all necessary permits from the appropriate authorities
- S1.2.9.** The Site shall be accessed from Darsait Street and across the Wadi. No other access is to be utilised by the Contractor or his Subcontractors. Signs shall be erected at the commencement of the Contract to ensure that this requirement is strictly observed. Offenders shall be banned from the Site.
- S1.2.10.** The full STP site access road from Darsait Street shall be formed, graded and paved by the Contractor as part of the Plant. The Contractor shall be aware that the site access road will be used by others. The Contractor shall establish his own gated entrance to the Site at a separate location to the entrance for the existing STP.
- S1.2.11.** After construction work has been completed the Contractor shall undertake any necessary repairs and refurbishment to return the site access road to an

as new condition regardless of the reason and responsibility for any damage which has occurred.

- S1.2.12.** The Contractor shall be aware that schools are located along Darsait Street and traffic movements on/off Site shall be scheduled to avoid times when the children are arriving / leaving. The Contractor shall also take all measures necessary to ensure all of his personnel are aware of the need for slow and careful driving of all vehicles down Darsait Street and onto the Site. A detailed traffic management plan shall be provided by the Contractor which clearly defines his proposals for the control of traffic movements. Speed restrictions shall be put in place for the actual site access road and on the Site itself. This plan shall be subject to the Project Manager's prior approval. The Contractor shall ensure that all drivers are completely aware of the existence and requirements of the traffic plan. If requested by the Project Manager the Contractor shall remove from his site establishment any individual who is observed to be driving in a manner which does not comply with the agreed traffic management plan.
- S1.2.13.** With reference to the drawings, an area to the west of the proposed new Plant has been provisionally designated for the Contractor's offices, together with the offices and facilities for the Purchaser's / Project Manager's personnel. The final location of these facilities may be amended to suit the Contractor's preferred arrangements for the Site but the offices for the Contractor and Purchaser / Project Manager shall be located in close proximity.
- S1.2.14.** As the Contractor will have appreciated from study of the site drawings the land available for working areas is extremely restricted. It is anticipated that the Contractor will only be able to establish his concrete batching plant and a limited amount of laydown/working areas within the Site itself. Consequently the Contractor will need to secure an off-Site compound area. Obtaining all permits necessary to set up the off-Site compound shall be the responsibility of the Contractor. The ability of a "just in time" delivery approach will be considered key to the successful delivery of Materials during the construction phase and the Contractor shall demonstrate to the satisfaction of the Project Manager the procedures he intends to put in place to achieve this approach.
- S1.2.15.** Residential staff/labour camps shall not be allowed on the Site or any adjacent land without the prior written approval of the relevant Authorities and the Project Manager. The Contractor shall provide the Project Manager with copies of all records related to permissions obtained for such camp. As with the Site any adjacent land occupied by the Contractor shall be provided with suitable high level sight barrier fencing.
- S1.2.16.** Prior to construction commencement, the Contractor shall ensure that all proposed temporary facilities are approved by relevant Ministries and Government bodies.
- S1.2.17.** The Contractor shall ensure sustainable solutions are fully considered for the design and construction of the Plant.
- S1.2.18.** The Contractor shall obtain permission from Muscat Municipality and all other relevant Authorities to determine suitable landfill sites for disposal of surplus/unsuitable excavated materials arising from his Works.

S1.4. STP SCOPE

General:

S1.4.1. The Plant will comprise a complete working STP as well as TE storage and pumping facilities. The key elements of the Plant are as follows:

- Sewage reception
- First stage screening with screenings treatment
- Lift pumping
- Combined grit and fat/oil/grease removal and grit treatment
- Second stage screening with screenings treatment
- Aeration lanes
- MBR basins
- Sludge storage and sludge treatment
- Odour abatement plant
- Treated effluent storage and pumping
- Sea outfall connection
- Chemical building
- Administration building
- Sub-station buildings
- Stand-by generation
- Building for inlet treatment plant
- Building for biological treatment plant
- Site access road
- Site roads
- Car parking
- Site boundary fencing/walls
- Guard house
- Weigh-bridge
- Hard/soft landscaping within and around the STP Site boundary
- Incoming power cabling
- All electrical works
- All instrumentation works
- All site DCS works
- All telemetry works
- Security system
- Fire detection/protection systems
- Telephone systems
- Wadi improvement works
- Site drainage works
- Site piping works
- Treated effluent tanker loading facility

S1.4.2. The Plant layout shown in the Contract Drawings has been developed to provide a compact solution and, to maximise the benefits of an MBR process, where common division walls can be utilised, with need for minimum distribution pipework.

S1.4.3. The Contract Drawings and the following descriptions reflect the design developed by the Purchaser. If the Contractor's accepted offer contained a different design or modifications to the Purchaser's design the Contract Drawings and the following descriptions are amended/superseded by the

Contractor's design. The Contract Drawings are annotated to confirm such situations.

S1.4.4. The main elements of the STP shall be housed in three separate areas designated, i) Inlet Treatment Building, ii) Biological Treatment Building and iii) Treated Effluent Facilities.

The main process units located in the Inlet Treatment Building structure shall be:

- First stage screens with screenings treatment
- Lift pump station
- Aerated grit/FOG removal lanes with grit treatment
- Second stage screens with screening treatment
- Sludge dewatering centrifuges with sludge conditioning
- Odour abatement plant
- 11kV/415V Sub-station
- MCC/Control room
- Sampler room
- Septage tanker / sewer jetter reception facilities
- Loading bays for skips used for off-Site disposal of screenings, grit and FOG
- Overflow systems connected to the sea outfall

The main process units located in the MBR Treatment Building structure shall be:

- Anoxic zone channels
- Four Aeration lanes
- Eight MBR basins
- Mixed liquor pumps
- Aeration blowers
- Membrane air scour blowers
- Surplus activated sludge pumps
- Permeate pumps
- Sludge storage tanks
- 11kV/415V Sub-station
- Standby generator
- MCC/Control rooms
- Sampler room
- Overflow systems connected to the sea outfall

The main process units located in the Treated Effluent Facilities area shall be:

- Two TE storage tanks with overflows connected to the sea outfall
- A TE pumping station
- Pre and post disinfection systems
- Pipework for connection to the existing TE transmission main
- 11kV/415V Sub-station
- MCC/Control room

Other than the ploy-prep system for the sludge dewatering plant all chemical handling, storage and pumping facilities shall be located in a centralised chemical building.

A STP administration building shall also be provided.

Electrical power distribution shall be provided from the 11kV secondary sub-stations.

- S1.4.5.** The building architectural proposals for the Plant have been developed to be sympathetic with the requirement to provide an external appearance which does not resemble a traditional STP. It is also required to maximise operational functionality and to provide ease of maintenance access to all items of equipment without the need for excessive personnel exposure to the external climate. The Contractor shall provide adequate ventilation and air-conditioning in the STP structures to allow comfortable working throughout the year for both personnel and equipment where appropriate.
- S1.4.6.** The Contractor shall be responsible for obtaining all necessary permits from the Authorities required for all the buildings within his scope of Works particularly the design/building permits from Muscat Municipality.
- S1.4.7.** The Contractor shall design, construct and install all civil structures and all electrical power supply/distribution systems to meet the design horizon of 2035 all as broadly outlined as follows and detailed in the Contract Drawings, the Specification and these Schedules.
- S1.4.8.** Process/M&E equipment shall be procured and installed in aeration lanes 1 to 3 and MBR basins 1-6 to satisfy the flows and loads arising from 75% of the 2035 design average inflow.
- S1.4.9.** The Contractor shall develop the design of the Plant buildings to maintain the architectural perspectives and concepts provided in the Contract Drawings. Spatial aspects of the Contract Drawings shall be amended to suit the Contractor's design. The Administration Building shall be designed and constructed in accordance with the Contract Drawings.
- S1.4.10.** The Contractor shall protect all concrete surfaces from corrosion attack from all sources. During the engineering period the Contractor shall report separately for the approval of the Project Manager on the measures to be taking with regard to the protection of all surfaces.
- S1.4.11.** The Contractor shall utilise the Contract Drawings as the design base for developing the best solution in terms of operability, maintainability, accessibility, aesthetics, functionality, durability and cost.

Sewage Reception:

- S1.4.12.** The Contractor shall arrange initially for the sewage to be diverted from the inlet sewer to the existing STP via a new sewer chamber. Construction of the diversion pipework and chambers forms part of the Works. The Contractor shall provide all necessary temporary works to allow the incoming flow to be readily switched from the existing STP to the new STP and back again.
- S1.4.13.** The reception arrangements shall also include facilities for the future connection of the proposed new sewage lines as shown in the Contract Drawings that will be installed under separate contracts.

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