

# Brief Scope of Work

Tender: T/2215391/2020

## Design, Supply & Installation of Drum Screen & Grit Control System at Al Ansab STP

### 1. INTRODUCTION

1.1 Oman Wastewater Services Company S.A.O.C (Haya Water) is a Sultanate of Oman Government owned company, and is empowered to build, own and operate the Wastewater Projects in the Sultanate (except for the Dhofar Governorate) covering wastewater collection, treatment and treated effluent distribution system. Haya Water invites bids for the services mentioned below from the following sewage treatment plants New Al Ansab (125,000 cum/day).

Haya Water is seeking proposal from Electrical & Instrument control system provider, to Upgrade, Design, Re-engineering, Supply & Install of Redundant Control System & MCC panels to handle Headworks Drum Screen, grit washer and screw conveyor in Ansab STP.

The structure of this SOW is bound to confirm that the Contractor shall adhere to the Haya Water Policies, Procedures, Health, Safety and Environmental commitments, and to ensure that the undertakings shall be safe and to carry out according to the specified standard quality.

1.2 The existing Siemens PLC's S7200 is obsolete and existing location shall be relocated and placed outside as outdoor unit. This shall include the electrical equipment related to the control panel.

Unit/Process Area	Existing PLC Make	Qty.	Remarks
Drum Screen	Siemens	4	
Grit Washer	Siemens	2	
Screw Conveyor	Moeller	2	Micro PLC / to be integrated to the redundant common PLC
Skip and slide gate	---	1	To be converted to Local panel
<b>Total</b>		<b>9</b>	

### 2. GENERAL SCOPE

- Contractor shall optimize, review and re-engineer the nine numbers (9 no.) control panels, to one redundant Control panel and integrate it to the existing DCS. The contractor shall exclude the Skip and slide gates and converted to Manual/Local Operation panel.
- The new proposed Control System shall fully redundant, ease of accessibility and maintainability and optimum protection of related Headworks equipment.

- Equipment furnished and installed under this section shall be fabricated, assembled, erected and placed in proper operating condition in full conformity with drawings, specifications, engineering data, instructions, and recommendations furnished by the equipment manufacturer unless exceptions are noted by the Engineer.
- The contractor shall gather all the necessary process/operation details from available drawings and site visits. The contractor is to ensure the newly built control PLC software suitable to all the control philosophy requirement and the various equipment shall function as normal using the newly provided PLC and the Electrical MCC panel.
- The contractor shall gather all the necessary Electrical and Instrument hardwiring information for Power and field instruments associated with the equipment. This is to be done using the available drawings and site visits. Accordingly, vendor to plan necessary panel design which shall include necessary termination for all the power and field instruments. Any required electrical contractors/breakers shall be considered with appropriate power ratings.
- The contractor shall also plan and provide the requirement for the new cable laying for Power and field instrument from the new panel to the existing field equipment. Signal/Power/communication cables shall be documented in the field cable schedule design document necessarily.
- Appropriate cable routing shall be done by the contractor using covered cable ducts or trays.
- All field cables for Power/Instrument/communication/Fibre supplied as part of this project shall be with industrial armored type.
- The Control system & Electrical MCC panels shall be fabricated and assembled by a single vendor or joint, who is fully experienced, reputable, and qualified vendor specialized in Electrical & Control System solution provider.
- All equipment shall be suitable for continuous outdoor exposure and temperature rating (0 C to +70 C). Contractor to use "Carbon Activated panel Filters" for the ventilation purpose for the control panel e.g. PERMATRON or equivalent. The contractor shall ensure the proposed carbon activated panel air filters are supporting to reduce the effect of H<sub>2</sub>S air contamination. Contractor can propose options for the filter in their proposal document.
- The panel enclosure shall be suitable for outdoor unit as per Haya Water specification. The panel enclosure cooling and air circulation shall fit the site condition.
- All panels to be utilized Roptec Cable transit system or equivalent in order to reduce gas ingress inside the panels.
- Power supply for MCC components and PLC components to be separated while designing.
- Supply and installation of Power and field instrument cables (industrial shielded and armored) from the new panel to the existing field equipment through UPVC pipes in concrete cased (mesh) duct bank at all road crossings from the termination box to the PLC Control Panel with GI trays and covers, supports, spacers, installed, connected, terminated, marked, tested and commissioned according to Haya water standards and specifications.
- Signal/Power/communication cables shall be documented in the field cable schedule design document necessarily as per Haya water standards and specifications.
- The cables duct should be separated and 2 times the cables size.
- Separate earthing to be provided for MCC and PLC panels with different earth pit. Testing and report shall be provided by the contractor
- Dual Hot redundancy in automated systems provides for switchover of functionality to a backup component in case of failure of a primary component. The switchover is considered automatic if no operator intervention is required. Redundancy applies to both hardware and software and implies no loss of continuity during the transfer of control between primary (active) and

redundant (backup) components. Redundant systems reduce single points of failure, preventing loss of functionality and data acquisition.

- The PLC shall be quoted (outdoor type) to withstand the H<sub>2</sub>S gas and moisture from corrosion.
- The HMI shall be quoted (outdoor type) to withstand the H<sub>2</sub>S gas and moisture from corrosion and 12 inch in size required or equivalent.
- Graphics design by the contractor and original backup to be provided.
- The approved Control Philosophy and O&M manuals shall consider and part of the scope of the contractor.
- The equipment shall be arranged to permit maintenance of all components from the operating floor.
- Ensure that the design of control system in such a way that Remote/Auto, Remote/Manual, Local/Auto, and Local/Manual for continuous operation of system, if communication or DCS fail. If PLC fail the local manual mode operation can operate the system.
- The protection shall be hardwired at all time and indicate the failure in the PLC and DCS.
- The contractor shall consider the full system control philosophy and all equipment related to the Drum Screen units, Screw conveyers' units, grit washer units, wash pumps and other related units.
- The contractor shall provide up to date new release software version and hardware equipment (Electrical & Instrument) under this scope. The contractor is not allowed to use any of the existing
- The contractor scope shall include the complete Profibus mapping list with slave address to be provided to DCS vendor before starting integration. The contractor PLC engineer service support required for loop checking for all Profibus mapping tags.
- The contractor shall use the new Profibus network Loop and decommission the old Profibus network. This is under contractor scope to ensure complete interface requirement is established for all the field equipment. Any additional Hardware/software requirement for the DCS shall also be part of the quote submitted by the contractor. PLC communication protocol to DCS should be supported both Profibus DP and Modbus TCP/IP.
- The Programming, Engineering and commissioning shall be done with equipment OEM (Drum Screen, Grit Washer, and Screw Conveyer) with Haya Water presence and engagement. It's under the contractor responsibility to involve the field equipment OEM for engineering and commissioning of this project. Skip and Penstock Valve OEM are excluded and the Local Operating Panel design and operation philosophy by component and certified contractor.
- The PLC program shall be written in the Ladder diagram format, clearly described each function in English.
- Hard and soft documents shall be provided in English (3 copies). System passwords shall be provided in Hard and soft copy. Original software and graphics backup shall be provided. License shall be provided to Haya Water and valid.
- The control philosophy shall be provided in Hard and Soft copy for review in the initial stage.
- Power Surge and lighting protection shall be provided and installed as per specification. Including UPS provision and installation for the PLC panel, which Haya Water shall provide and handed over to the contractor once mobilized.
- The contractor shall provide Industrial enclosure and protection for new control panel and MCC as per Haya water specification.
- The Contractor is responsible for the protection of the working and surrounding areas, facilities, utilities and equipment.

- The contractor shall provide tagging for panel, equipment, termination box/panel and Emergency switch as per Haya Water standard specification.
- Execute the works in strict accordance with the terms and conditions of this Contract and to the satisfaction of Haya Water and shall comply with and adhere strictly to all pertinent Code of Practice, Standards, Technical Specifications, applicable rules and regulations as defined within the latest issue of Haya Water Reference Documents and all other statutory requirements as may be issued from time to time.
- The Contractor shall be deemed to have fully allowed for complying with all requirements of Haya Water's Safety Reference Documents.
- Contractor must notify Haya Water in writing for any work that falls under the category of additional services and do not commence without written approval of Haya Water except as specifically provided for within this Contract.

### **TENDER FEE PAYMENT:**

The tender documents can be downloaded from Haya Water website after transferring the tender fee to Haya Water Bank account which its details as below:

**Account Number 0423 01092 130 0017**  
**Account holder's name: Haya Water**  
**Bank: Bank Muscat SAOG**  
**Branch: Corporate Branch**  
**Place: Ruwi**  
**Country: Sultanate of Oman**  
**SWIFT CODE: BMUSOMRXXX**