

ANNEX

GENERAL SITE CONDITIONS & SCOPE OF WORK

Site Conditions:

- ❖ Maximum Ambient temperature: 45C° - Maximum Relative Humidity: 80%
- ❖ Altitude above mean sea level: 870 meters .
- ❖ Atmosphere: Hot and dry climate.
- ❖ Location:
 - The Well : (13° 50.121'N, 45° 52.437'E)
 - The village : (13° 48.008'N, 45° 53.047'E).

TECHNICAL SPECIFICATIONS

GENERAL

- The goods to be supplied must be new and unused.
- Delivery and testing of supplied goods of supplied goods will be made for the National Water and Sanitation Authority (NWSA) – Ataq Branch at warehouses.
- The bidder shall visit the installation sites before submitting his offer.
- Relevant original descriptive literature of the Goods showing conformity to the technical specifications must be provided with the bid. Irrelevant literature downloaded from the Internet shall not be accepted.
- These specifications describe the basic requirements for goods. Tenderers are requested to submit with their offers the detailed specifications, drawings, catalogs, etc. for the products they intend to supply.
- All the dimensions and capacities of the equipment to be supplied shall not be less than those required in these specifications .

Scope of Work

The scope of work is :

- Supply and installation of water network, including PE pipes and G.I pipes.
- Supply and installation of valves, valve chambers, and installation accessories.
- Supply and installation of a Booster pump with all its accessories.
- Construction of pumping room.

As specified in the technical specifications and BoQ.

Standards

All goods shall comply with the requirements of the latest issue (with up-to-date amendments) of the appropriate standard or standards of the American Society for Testing of Material (ASTM), British Standards Institution (BS) or International Organization for Standardization (ISO) standards, German Standards (DIN) or their equivalents as approved by the Purchaser. Once the Bid has been accepted and a Contract awarded, the successful Bidder shall furnish two (2) original copies of the standards with which the goods are complying in English. If the original standards are in a language other than English ,then authenticated English translations must be submitted in addition. Where reference is made to a particular



manufacturer's product, such reference shall be taken only as an indication of design and quality unless otherwise stated.

Climate

All materials and equipment incorporated in the work shall be capable of withstanding shade temperatures of 50°C and, if exposed to direct sunlight, shall be capable of withstanding the additional heat gain up to 60°C and approx. 80% humidity. All materials and equipment shall account for generally tropical conditions, including occasional dust storms, intense rain storms, and a salty atmosphere at locations near the coast.

Manufacturers

Submit with the Bid detailed product specifications, performance characteristics, and catalogs, including manufacturer names and model numbers, for all materials and equipment to be supplied.

Markings

Unless otherwise specified in the relevant standard, products are to have the following legible marks as appropriate, cast, stamped, or indelibly painted:

- Manufacturer's name, initials, and identification mark.
- Class designation.
- Date of manufacture.
- Initials and several relevant standards.

Testing

The Supplier shall offer all goods and materials for inspection, examination and witness testing. He shall inform the Purchaser or his authorized representative of the date when the goods and materials will be ready for inspection and witness testing. If the tests are beyond the resources of the supplier, he shall make arrangements for these to be carried out elsewhere. Any variation of this requirement shall be agreed upon and confirmation in writing obtained from the Purchaser or his authorized representative. The Supplier shall give the Purchaser or his authorized representative reasonable notice of his intention to carry out tests and that the goods are ready for testing. The Supplier shall carry out tests as stated in the current appropriate international standard, performance tests, and such other tests as are necessary, in the opinion of the Purchaser or his authorized representative, to determine that the goods comply with the Specification, either under test conditions in the Supplier's works, or elsewhere. Whenever required by the Purchaser or his authorized representative, supply and transport to a testing laboratory a sample of materials selected by the Purchaser or his authorized representative. All supplied goods and materials should be tested, and if 25% of the total No. of supplied goods and materials fail the test, all the goods from the supplied manufacturer are rejected and replaced by materials from a different manufacturer, subject to approval and satisfactory tests. Provide laboratory test reports in an approved form. Where tests and inspection have been completed to the Purchaser or his authorized representative's satisfaction and when the test certificates have been checked, the Purchaser or his authorized representative shall confirm acceptance in writing and the goods and materials shall not be delivered until this acceptance has been received. Where witness tests are not required, the test certificate shall be forwarded to the Purchaser or his authorized representative within two weeks after instructions to waive witness tests have been received. On each test certificate, sufficient information to enable the Purchaser or his authorized representative to issue a release certificate, including the Specification Contract number and details, shall



be given for ready identification of the material or equipment to which to the certificate refers. No inspection or passing by the Purchaser or his authorized representative of the goods or materials covered by the Supplier shall release him from any of his obligations under the Contract. The Purchaser or his authorized representative reserves the right to require the Supplier to meet any extra costs which are occasioned by failure of the Supplier to comply with the above testing and inspection requirements, including the provision of test certificates, or which in the opinion of the Purchaser or his authorized representative are due to insufficient care having been taken by the Supplier before presenting the goods and materials for inspection or test. If unauthorized delivery has taken place, the Supplier may be required to arrange for the materials to be returned for inspection and /or witness testing at the Supplier's expense. Any equipment used in the testing of the goods and materials shall in all respects comply with the appropriate safety regulations and/or requirements regarding electrical apparatus for the safety of the Plant and the men working thereon. The Supplier shall ensure that all his suppliers are given copies of the Specification. Full details of the method of testing proposed for each item shall be submitted with the Bid. The Bid Prices shall include the costs of all tests, including temporary erection, labor, materials, instrumentation, stores, fuel, and power used. as may be required during all inspections and tests and for the provision of certified records. The Bid Prices shall also cover all the costs incurred during works testing, including accommodation, traveling expenses, and all reasonable expenses, by two representatives of the Purchaser or his authorized representative, allowing for individual inspection visits, each of duration of 2 days. The above periods are deemed to exclude any necessary re-inspection visits arising from any abortive inspection visits resulting from the Supplier's failure to comply with the requirements of this Specification.

Manufacturer's Certificate

Products are to be supplied with certificates stating that they comply with and have been factory-tested in accordance with the specified standards. Individual test certificates are to be supplied with every product.

Other Commitments

All offers must include the following items:

- The original certificate for all supplied items
- The authorization of the manufacturer
- Performance test certificate from the manufacturer
- Recommended and priced spare parts lists for 2 and 5 years
- Recommended and priced special tools
- All original and completed catalogues for each supplied item
- At least one-year warranty from the date of signature on the Project Acceptance/Handover Document. (Any other warranty will not be accepted)
- Maintenance guarantee for 1 year
- Service and parts manuals

TECHNICAL SPECIFICATIONS

1. BOOSTER PUMP

S.N.	DESCRIPTIONS	SPECIFICATIONS
1.1	Pump Type	Horizontal, single-stage, non-self-priming End-Suction centrifugal pump, suitable for clean water and continuous operation.
1.2	Required Duty Point	Flow $Q \geq 50 \text{ m}^3/\text{h}$ at Total Head $H \geq 40 \text{ m}$, simultaneously at the same operating point, as demonstrated on the manufacturer's certified Q-H curve.
1.3	Pump Efficiency	Hydraulic efficiency at the required duty point shall be $\geq 70\%$, with the selected duty point within the manufacturer's recommended operating range and reasonably close to BEP.
1.4	Working Pressure	Maximum operating pressure shall be not less than 16 bar (PN16).
1.5	Pump Casing	Cast iron EN-GJL-250 / ASTM Class 35 or better, suitable for clean-water service and the specified working pressure.
1.6	Impeller	Stainless steel or bronze, corrosion-resistant and suitable for clean-water pumping.
1.7	Shaft & Mechanical Seal	Stainless-steel shaft, AISI 304 or better, with high-quality replaceable mechanical seal suitable for continuous clean-water service.
1.8	Electric Motor	Three-phase, squirrel-cage asynchronous TEFC motor, continuous duty S1, suitable for operation with an external VFD.
1.9	Electrical Characteristics	380–415 V, 3-phase, 50 Hz. Motor power shall be properly selected by the manufacturer to prevent overload throughout the approved operating range.
1.10	Motor Efficiency & Protection	Motor efficiency class IE3 or higher, protection IP55 or higher, insulation Class F or higher, suitable for hot climatic conditions.
1.11	Connections & Standards	Flanged suction and discharge connections, PN16. Hydraulic performance according to ISO 9906:2012 Grade 3B or better, with EN 733 / EN 1092 or approved equivalent where applicable.
1.12	Manufacturer & Technical Submittals	European manufacture. Supplier shall submit the exact manufacturer's catalogue, pump selection sheet, Q-H, efficiency, power, and NPSHr curves, motor datasheet, materials, dimensional drawing, and Certificate of Origin.

2. Inverter

S.N.	DESCRIPTIONS	SPECIFICATIONS
2.1	Types	Inverter
2.2	Brand	NEW
2.3	Manufacturing Year	2024
2.4	Origin	European Or Equivalent
2.5	Inputs	Two inputs for current: AC and DC, capable of merging from an external source (grid or generator)
2.6	Capacity	1.5 times the capacity of the electric motor
2.7	Maximum DC Voltage	Not less than 800 volts DC
2.8	MPPT Voltage Range	420 to 750 volts
2.9	Output Voltage Range	3-phase 415-380 volts, adjustable
2.10	Output Frequency Range	50 Hz, adjustable
2.11	Protections	Overload, thermostat motor protection relay, phase sequence and reverse protection, dry running protection, pressure protection, excess starting time protection, earth fault protection, gauge indication for volts, ampere, running hours counter, operation switch (manual - automatic and neutral), built-in communication interface
2.12	Additional Protections	Over/under voltage, overcurrent, overload, phase monitor, reverse phase protection, electrical contact, insulation loss, appropriate protection for the number of startups
2.13	Protection Degree	IP65

3. SUBMERSIBLE CABLE

S.N.	DESCRIPTIONS	SPECIFICATIONS
3.1	Types	Flexible rubber cable
3.2	Brand	New
3.3	Manufacturing Year	2022
3.4	Origin	European Or Equivalent
3.5	Size	As BoQ
3.6	Phase Conductors	Conductor material Tinned copper
3.7	Conductor construction	class 5 IEC 60228
3.8	Insulation material	Acc.to EN 50363-1,
3.9	Cores identification	According to HD 308
3.10	Material	According to EN 50363-2-1
3.11	Color	Blue
3.12	Based on	EN 60228 and IEC 60228.
3.13	Nom. rated voltage U0 / Uv -kV	450/750 - 0,6/1
3.14	Test voltage kV	2,5 - 4
3.15	Max AC voltage V -kV	520/900 - 0,7/1,2
3.16	Max. short-circuit temp. °C	250
3.17	Max. working temp. on the conductor °C	90
3.18	Max water temperature °C	40

4. Three-phase step-down transformer

4.1	Applicable Standards	Latest applicable editions of IEC 60076 series for power transformers and IEC 60296 for mineral insulating oil.
4.2	Type and Rating	Outdoor, three-phase, oil-immersed distribution transformer, 100 kVA continuous rating, ONAN cooled. Hermetically sealed corrugated tank preferred; conservator type may be accepted subject to approval.
4.3	Rated Voltage and Frequency	11/0.415 kV, 3-phase, 50 Hz; highest system voltage $U_m = 12$ kV. Rated currents approximately 5.25 A HV and 139 A LV.
4.4	Vector Group and Connections	Dyn11; HV winding delta-connected and LV winding star-connected, with the neutral terminal brought out for connection to the earthing system.
4.5	Off-Circuit Tappings	Five HV tap positions: -5%, -2.5%, 0%, +2.5%, and +5%, corresponding to 10.45, 10.725, 11.00, 11.275, and 11.55 kV.
4.6	Windings, Core and Insulation	HV and LV windings shall be copper. Core shall be low-loss CRGO silicon steel. Insulation class shall be Class A or better.
4.7	Insulating Oil	New, unused, PCB-free mineral insulating oil complying with IEC 60296, suitable for the specified temperature and outdoor operating conditions.
4.8	Impedance, Losses and Temperature Rise	Short-circuit impedance: 4.0–4.75%. Maximum no-load loss: 360 W; maximum load loss: 2,100 W at 75°C. Top-oil/winding temperature rise shall not exceed 55/60 K.
4.9	Insulation Levels and Accessories	HV withstand: 28 kV for 60 seconds and 75 kV lightning impulse; LV withstand: 3 kV for 60 seconds. Complete with pressure relief, oil level indication, drain/sample valve, bushings, earthing terminals, lifting lugs and rating plate. Conservator units shall include a silica-gel breather.
4.10	Tests and Documentation	Each transformer shall undergo IEC routine tests, including winding resistance, ratio, vector group, no-load/load losses, impedance, applied and induced voltage tests, insulation resistance, oil breakdown voltage and tank leakage. Certified test reports and valid type-test evidence shall be submitted.

5. HDPE PE100 PN20 PRESSURE PIPES

S.N.	DESCRIPTIONS	SPECIFICATIONS
5.1	Type and Application	Solid-wall HDPE pressure pipe suitable for buried potable-water transmission pipelines.
5.2	Applicable Standards	ISO 4427-1 and ISO 4427-2:2019+A1:2023, EN 12201, and DIN 8074/8075 where compatible with ISO 4427.
5.3	Material Classification	Pre-compounded PE100, MRS ≥ 10 MPa, design coefficient $C = 1.25$, and hydrostatic design stress of 8 MPa.
5.4	Nominal Outside Diameter	OD 250 mm.
5.5	Nominal Pressure Rating	PN20, rated for a maximum allowable operating pressure of 20 bar at the reference temperature of 20°C.
5.6	Dimension Ratio and Pipe Series	SDR9, Series S4.
5.7	Dimensions and Tolerances	Minimum wall thickness 27.9 mm; mean outside diameter 250.0–251.5 mm; maximum out-of-roundness 5.0 mm, measured according to ISO 3126.
5.8	Raw Material and Colour	Black, UV-stabilized PE100 compound with blue identification stripes. External recycled or externally sourced reprocessed material shall not be used.
5.9	Appearance and Potable-Water Suitability	Internal and external surfaces shall be smooth, clean, and free from cracks, cavities, scoring, inclusions, or harmful defects. Material shall be certified for potable-water contact.
5.10	Jointing, Length and Marking	Straight lengths, normally 6 m or 12 m as approved, suitable for hydraulic butt fusion. Each pipe shall show manufacturer, PE100, OD250, SDR9, PN20, standard, batch, and production date.
5.11	Required Test Results	Dimensions: OD 250.0–251.5 mm, wall thickness ≥ 27.9 mm and SDR9. Tensile stress at yield: ≥ 20 MPa project minimum. Elongation at break: $\geq 350\%$. Hydrostatic strength: no failure at 20°C, 100 h and 12.0 MPa hoop stress; no failure at 80°C, 165 h and 5.4 MPa; and no failure at 80°C, 1,000 h and 5.0 MPa. OIT: ≥ 20 min at 200°C. MFR change after processing: within $\pm 20\%$. Density and unit weight shall be reported and consistent with the approved compound and manufacturer's data.

6. PV MODULES

S.N.	DESCRIPTIONS	SPECIFICATIONS
6.1	Total capacity	Must not be less than 1.5 times the motor capacity
6.2	Module efficiency	Not less than 21%
6.3	Cell type	Monocrystalline
6.4	Panel capacity	Not less than 660 watts
6.5	Number of panels per string	16
6.6	Maximum voltage at maximum power	Not less than 38 volts
6.7	Maximum current at maximum power	Not exceeding 17 amperes
6.8	Module class	A
6.9	Maximum DC voltage	1500 VDC
6.10	Nominal Operating Cell Temperature (NOCT)	-40 to +85 °C
6.11	Maximum pressure tolerance	Not less than 5400 Pa
6.12	Temperature Coefficient of Voc	Not more than -0.26 %/°C
6.13	PV modules warranty	25-year linear performance warranty, 10-year product workmanship warranty
6.14	Fill factor	More than 75%
6.15	Compliance	IEC 61215, IEC 61730-2, IEC 61730-1 from TUV or ISO
6.16	Busbar lines	5 to 12 lines per cell