Scope of works & building specifications

Introduction:

Islamic Relief Worldwide has been operating in Sudan since 1984, initially responding to a famine. They have established a main office in Khartoum and expanded their presence to multiple states within Sudan. The IR Sudan operations include providing emergency relief, food security, livelihood support, women's empowerment, education, and basic health services. Also, IR Sudan run programs for orphans and offer seasonal support like Ramadan and Qurbani distributions.

Islamic Relief's work in Sudan has focused on assisting those affected by conflict, displacement, and natural disasters and provided aid to over 1.2 million people affected by the recent conflict, distributing food, water, and hygiene kits. In addition to this, IR Sudan support health centers and nutritional feeding centers, and have provided financial assistance and livelihood support to displaced families.

Currently IR Sudan is looking to engage with qualified contractor to drill and install 2 New Boreholes in Gedaref State.

Scope of works:

- The successful contractor will be given the task to undertake the Drilling and installation of 2 New Boreholes (Abu Al-Najah and Al-Agib) in Gedaref State.
- The construction works must be completed according to the BOQ specification.
- The contractor should be able and have the capacity to supply the required materials, skilled, un-skilled labors , equipment and tools to complete the construction works within the time frame specified in work plan and with required quality.
- Any change or amendment on the construction works, BOQ and scope of work should be discussed and agreed with IR Sudan field engineer in advance and on writing.
- The contractor should supply good quality materials in complaisance with IR Sudan procurements standards and execute work as specified bellow and detailed in the drawing.

Works specification:

Drilling and installation of New Borehole (200 meter) in Abu Al-Najah - Gedaref State:

Drilling a ground water borehole using a combined drilling rig

- Drilling through the upper soft formations with a diameter of 18 inches to a depth of 7 meters.
- Supply, lowering, and installation of 16-inch diameter steel conductor casing with 8 mm thickness.
- Vertical drilling in hard and sedimentary formations from a depth of 7 meters down to 200 meters with a 14-inch diameter.
- Supply, lowering, and installation of 10-inch casing pipes (ASTM standard).
- Supply and installation of 10-inch Johnson screen filter pipes, rated at 40 bar pressure, with 40 mm slots (40×40).
- Development and cleaning of the borehole through backwashing, followed by air-lift cleaning using an air compressor.
- Installation of upper and lower well caps.
- Supply and placement of a gravel backfill (Gravel Pack) size (M4–2), rounded in shape, from the bottom of the screens up to the top.
- Casting a concrete slab around the borehole using a 1:2:4 concrete mix with dimensions (1 × 1 × 0.1 m).
- Conducting a water yield test for the borehole to determine its discharge rate and select the appropriate submersible electric pump.
- Conducting chemical analysis of the water sample to determine its suitability for human consumption.
- Preparation of a comprehensive technical report including sample descriptions, design and data logging (Logger), production testing, water sample analysis, and geological/biological characterization of subsurface layers.

Pumping system works

- Supply of a 3-inch submersible electric pump powered by solar energy, European-made, with a production capacity of 15–20 cubic meters per hour and a total dynamic head of 180–200 meters, equipped with stainless steel impellers, including a complete control panel (switchboard) with full protection systems.
- Supply of 3-inch ASTM corrosion-resistant pipes, 3-meter length, 5-mm thickness, with threaded couplings; one-year warranty.
- Supply and delivery of 16 mm^2 (C4) borehole cable, four-core flat, made of high-quality copper.
- Supply and delivery of 2.5 mm^2 high-quality copper wire.
- Supply of materials and fabrication of a complete 3-inch standpipe, including a 3-inch flanged valve, a flanged non-return (check) valve, and a water meter with all accessories.
- Supply a 3-inch flanged knife gate valve complete with bolts and rubber gaskets.
- Supply of a 3-inch flanged non-return (check) valve with good specifications, including bolts and rubber gaskets.

Installation and operation works of the solar power system

- Supply and installation of 550-watt solar panels with excellent quality.
- Supply of a 100-amp changeover switch.
- Supply of a 15 HP inverter (65 kW), brand Faddish or Enfed, complete with enclosure box, AC & DC switches, 100 Amp fuses, 1500 Volt rating, and full protection system.
- Supply of DC platinum cable, 10 mm, twin (double-core).
- Supply and installation of a complete lightning protection system.
- Supply and installation of a solar panel mounting structure using 12-inch I-beams for the foundations, pipes (84) with bracing, casting of foundations with concrete mix ratio 1:2:4, proper welding, and burying the cable underground.
- Supply selected fill material and spread it under and around the solar panels.
- Construction of a fence using galvanized gabion wire of 2 mm thickness with 5×5 cm openings, supported by imported 2-inch angle steel of 5 mm thickness, with a total height of 2.5 m and post spacing of 2 m; posts to be cast on concrete foundations of 50×50×60 cm with three longitudinal reinforcement bars of 4 mm diameter, installation of razor/spiral barbed wire on top, construction of a 3 m wide gate made of square steel pipes 4×8 cm with 3 mm thickness, supports made of steel beams 12 cm wide and 6 mm thick with a height of 2.5 m, fabrication and installation of the Islamic Relief organization logo on the gate using heavy imported steel sheet of 5 mm thickness, cut by CNC machine, with proper painting using anti-rust paint for all fence posts and gate, followed by final painting in white and blue, all in accordance with good workmanship practices and the supervising engineer's instructions.
- Supply and installation of a signboard (3 m height × 1.8 m width) made of heavy imported steel sheet (8 mm thick, high durability). The structural frame shall be made of galvanized pipes (3 inches diameter, 5 mm thick) for the main frame, with a base extension (Dastoor) at the end of each pipe fixed into the ground and cast with white concrete mix (1:2:4). The inner frame supporting the steel sheet shall be made of heavy imported rectangular hollow sections (4×8, 5 mm thick). All joints shall be properly welded, and the edges smoothed using a grinding stone to eliminate sharp surfaces. The structure shall be fixed at ground level (0.70 m depth) and supported with 3-inch, 8 mm steel angles embedded in concrete mix (1:2:4) from both the front and back sides. The braces shall be installed at a height of 2.3 m from the signboard and embedded 70 cm into the ground. The signboard shall be painted with one anti-rust primer coat and three finishing coats. The content and logos shall be clearly hand-painted on both sides with oil-based paint. The cost shall include all excavation, fittings, welding, fixing, transportation to the required sites, and painting works, all as per the supervising engineer's instructions.

Drilling and installation of New Borehole (75 meter) in Al-Agib - Gedaref State:

Drilling a ground water borehole

- Drilling in soft soil layers with a diameter of 14 inches.
- Supply and installation of 12-inch, 10-bar UPVC or 5-mm steel pipes.
- Vertical drilling in hard layers with a diameter of 10 inches.
- Supply, lowering, and installation of 10-inch casing pipes (ASTM standard).
- Supply and installation of 10-inch Johnson screen filter pipes, rated at 40 bar pressure, with 40 mm slots (40×40).
- Well development and cleaning using an air compressor or bucket method.
- Installation of a top well cap and construction of a concrete slab around it (120 × 120 × 120 cm).
- Supply and placement of a gravel backfill (Gravel Pack) size (M4–2), rounded in shape, from the bottom of the screens up to the top.
- Casting a concrete slab around the borehole using a 1:2:4 concrete mix with dimensions (1 × 1 × 0.1 m).
- Conducting a water yield test for the borehole to determine its discharge rate and select the appropriate submersible electric pump.
- Conducting chemical analysis of the water sample to determine its suitability for human consumption.
- Preparation of a comprehensive technical report including sample descriptions, design and data logging (Logger), production testing, water sample analysis, and geological/biological characterization of subsurface layers.

Pumping system works

- Supply and installation of a 2-inch European-made submersible electric pump with a stainless-steel impeller, production capacity of {5–11} m^3/h, lifting head of 80 m, including a control panel (switchboard) and a 4-core cable of 80 m length, complete with all protections and accessories. The pump shall be supplied after the production test.
- Supply and delivery of 16 mm^2 (C4) borehole cable, four-core flat, made of high-quality copper.
- Supply and installation of 2-inch, 27-bar UPVC pipes, 3 m length each.
- Supply and installation of a 2-inch good-quality check valve.
- Supply and installation of a 2-inch good-quality flanged gate valve .
- Supply a 3-inch flanged knife gate valve complete with bolts and rubber gaskets.
- Supply of a 3-inch flanged non-return (check) valve with good specifications, including bolts and rubber gaskets.

Installation and operation works of the solar power system

- Supply and installation of 550-watt solar panels with excellent quality.
- Supply of a 100-amp changeover switch.
- Supply of a 15 HP inverter (65 kW), brand Fedish or Enfed, complete with enclosure box, AC & DC switches, 100 Amp fuses, 1500 Volt rating, and full protection system.
- Supply of DC platinum cable, 10 mm, twin (double-core).
- Supply and installation of a complete lightning protection system.
- Supply and installation of a solar panel mounting structure using 12-inch I-beams for the foundations, pipes (84) with bracing, casting of foundations with concrete mix ratio 1:2:4, proper welding, and burying the cable underground.
- Supply selected fill material and spread it under and around the solar panels.
- Construction of a fence using galvanized gabion wire of 2 mm thickness with 5×5 cm openings, supported by imported 2-inch angle steel of 5 mm thickness, with a total height of 2.5 m and post spacing of 2 m; posts to be cast on concrete foundations of 50×50×60 cm with three longitudinal reinforcement bars of 4 mm diameter, installation of razor/spiral barbed wire on top, construction of a 3 m wide gate made of square steel pipes 4×8 cm with 3 mm thickness, supports made of steel beams 12 cm wide and 6 mm thick with a height of 2.5 m, fabrication and installation of the Islamic Relief organization logo on the gate using heavy imported steel sheet of 5 mm thickness, cut by CNC machine, with proper painting using anti-rust paint for all fence posts and gate, followed by final painting in white and blue, all in accordance with good workmanship practices and the supervising engineer's instructions.
- Supply and installation of a signboard (3 m height × 1.8 m width) made of heavy imported steel sheet (8 mm thick, high durability). The structural frame shall be made of galvanized pipes (3 inches diameter, 5 mm thick) for the main frame, with a base extension (dastoor) at the end of each pipe fixed into the ground and cast with white concrete mix (1:2:4). The inner frame supporting the steel sheet shall be made of heavy imported rectangular hollow sections (4×8, 5 mm thick). All joints shall be properly welded, and the edges smoothed using a grinding stone to eliminate sharp surfaces. The structure shall be fixed at ground level (0.70 m depth) and supported with 3-inch, 8 mm steel angles embedded in concrete mix (1:2:4) from both the front and back sides. The braces shall be installed at a height of 2.3 m from the signboard and embedded 70 cm into the ground. The signboard shall be painted with one anti-rust primer coat and three finishing coats. The content and logos shall be clearly hand-painted on both sides with oil-based paint. The cost shall include all excavation, fittings, welding, fixing, transportation to the required sites, and painting works, all as per the supervising engineer's instructions.

General notes:

Materials/Equipment to be supplied by contractor:

- All materials and equipment supplied locally by the contractor shall be of the best quality in their class and of the respective kinds as described in the contract and in accordance with the "Supervisor's" instructions and to the satisfaction of the IR Sudan Engineer. They shall be inspected from time to time at the site during the progress of the work.
- Any materials/equipment arriving on site found unsuitable shall be rejected. The contractor shall replace the rejected material/equipment at his own expense.

Health & Safety

Safety

During implementation period, many factors of safety should be considered:

- Laboure's shall have enough and appropriate digging tools and keep excavated materials back at least 600 mm (2 ft.) from the edge of any trench excavation and 1.2 m (4 ft.) from any other excavation.
- Protective gloves and suitable protective clothing to protect hands or the whole body as required that should be provided to Laboure's.
- Provide a ladder when workers are required to enter excavation over 1.5 meter (5ft) in depth, the ladder should be properly fixed to prevent slipping.
- During the digging some argument should take place to prevent falling stone in the well, and support the sides of excavations by sheet pilling, shorting and bracing to guard against danger to workers from fall or dislodgement of earth, rock or other material.
- The well should be covered during the night to prevent falling children inside.
- Fence the construction site to prevent the entry of unauthorized persons on construction sites, which are located in built-up areas and alongside vehicular and pedestrian traffic routes.
- The contractor shall also follow the field engineer of IR Sudan guidelines for working in excavations and ensure that these standards are met at all times during construction work alongside the above specific points.

Quality assurance:

All materials and equipment supplied by the contractor shall be of the best quality in their class and of the respective kinds as described in the contract and in accordance with the (supervisor's) instructions and to the satisfaction of the IR Sudan engineer. They shall be inspected from time to time at the site during the progress of the work. Any materials / equipment arriving on site found unsuitable shall be rejected. The contractor shall replace the rejected materials at his own expense.

Materials and workmanship:

All the work noted in this specification must be carried out to the highest standard which is normally possible using only the best materials and most skilled workmen. Samples of all construction materials must be shown to a representative of IR Sudan for written approval before starting construction.

Site in charge:

The contractor must employ an experienced site-in-charge who must be on site to supervise the work at all times when work is generally leave the whole area of the site clean, washed, tidy and ready for use.

A. Basic materials:

Cement:

The choosing of cement brand must agree with a representative of IR Sudan. All cement brought to the site must be fresh (manufactured within previous tree months) and in perfect condition for use. All cement brought

must be stored carefully so that it remains in perfect condition. Storage must be a totally dry place with a platform of planks or bamboo to keep all cement 6 minimum height above ground.

Coarse aggregate for concrete:

The first choice of coarse aggregate chosen by IR Sudan is graded river gravel of suitable type and strength. The second choice of aggregate is broken stone of suitable type and strength.

The source of aggregate should be clean and free from impurities and plant material. The shape of the aggregate should be mostly rounded with a small number which are long or flat. If this type of aggregate is not available the contractor must agree with a representative of IR Sudan which other type to use.

Sand:

The first choice of sand chosen by IR Sudan is good quality river sand. The sand must not contain mud, dust, or pieces of plants. The contractor must make all efforts to obtain coarse sand (with zero fines). A sample of sand must be shown to a representative of IR Sudan. For plastering the sand must be sieved according to the IR Sudan field engineer additional specification.

Water:

Clean water must be used in all construction works especially for plaster or mortar. The contractor must inform a representative of IR Sudan. As to the source of water used in all construction works.

B. Workmanship:

Blockwork wall workmanship:

All block walls should be laid in 1:2:4 cement: sand mortar. All bricks or block surfaces must be wetted with water before laying commences. Blocks should be soaked for just sufficient time for water to penetrate the whole brick. Existing wall brick layers should be wetted slightly before laying new bricks. All vertical and horizontal joints are to be completely filled with mortar. New brickwork and blockwork must not be laid for more than 1m above the general construction level at any one time. Brickwork and blockwork must be kept covered with wet sacking for one week after laying.

Concrete workmanship:

All materials for concrete (cement, sand, aggregate and water) must meet the quality specifications set out in section B. The proportions of cement, sand and aggregate and must be determined by volume according to the following table:

Concrete mix (1m3)	Cement	Dry sand	Gravel
1:2:4	320 kg	0.45 m3	0.9 m3
1:3:6	220 kg	0.46 m3	0.92 m3

Water / cement ratio quantity of water must not exceed the following:

Concrete mix	Amount of water
1:2:4	32 liters per 50kg cement
1:3:6	25 liters per 50kg cement