

**Scope of Work for Rehabilitation and Upgrading of Hand-Dug Well to Water Yard in Jokosti**

Catholic Relief Services (CRS) – United States Conference of Catholic Bishops, an international relief and development agency, committed to the alleviation of human suffering, development of people and fostering of charity and justice in the world irrespective of race, creed, or nationality.

CRS seeks qualified entity specialized and experienced in water industry and construction of water systems (including water wells, water pumping components, solar energy set, elevated water storage and distribution pipework etc.) to work in **Jokosti village** in Central Jebel Mara locality (Golo) - Central Darfur State; the activities include rehabilitation of hand dug well, upgrading to mini water yard consists installation of submersible pump, solar energy unit, installation of elevated water tank and water pipework, and fencing of each component of the system, during the period from 01st Jan 025 to 15th Feb 2025.

**Primary Functions**:

Under the overall guidance and direct supervision of CRS WASH Senior project officer (SPO), the **contractor** should rehabilitate, and upgrade one hand dug well to water supply, storage, and distribution system in line with technical guidelines of Water and Environmental Sanitation Project (WES)-Sudan and CRS field staff.

**The contractor responsibilities:**

The specific tasks of the contractor under this scope of work should be implemented under direct supervision and instruction of CRS field staff, and each completed stage of the work should be accepted and approved by CRS field staff, and the contractor should implement and complete any required repair or amendment before starting the next stage. The work includes, but not limited to the following:

1. **Rehabilitation of hand dug well:** *(At: coordinate: Long E: 24.34771 Lat N: 13.13174 altitude: 1680 m)*
   1. Remove existing reinforced cover and build and raise the top of the lining above ground surface by additional 1 meter, should be built of red bricks and/or stones and cement-sand mortar. *(the diameter of the well is 2.25 meters)*
   2. Construct a tight well cover of reinforced concrete slab with a manhole (60cm\*60cm) with lid equipped of lock to enable future cleaning and maintenance of the well. The reinforced cover of the manhole should be tight and leakage proof.
   3. Install heavy duty steel beams at the top of the well to support the concrete cover, pumphouse casing, and hold the pump.
   4. Install pump house pedestal, UPVC pipe and screen, from the top to the bottom of the well with diameter within range from 5 to 8 inches to properly fit the bowl size of the selected pump and allow suitable clearance for safe installation and retrieval of the pump. The top 6 meters of the casing and 2 meters at the bottom of the casing should be of blind (plain) casing and the portion in between should be of original UPVC screen of slot size range 0.04-0.06 inch,
   5. Clean the lining wall by using suitable long-handled wire brush to remove the algae and other dirt layers, then wash with high pressure water jet.
   6. Clean the bottom of the well and remove the sludge and all materials deposited inside the well at the bottom until all the original total depth is cleaned i.e. to remove at least 3.10 meters-thick layer of deposits from the bottom, to increase the current free depth from 12.90 m to 16 m (original depth).
   7. Dewater the well until the turbid water completely discharged out and the turbidity level around 5 NTU unit or less.
   8. Disinfect the well with high (concentration) chlorine dose applying shock chlorination processes according to the standard steps for chlorination.
   9. Dewater the well and measure the residual chlorine.
   10. Construct fence around the well 4m\*4m with door 1m\*1.6m with control lock.
2. **Supply and Installation of Submersible pump and pipework:**
   1. Import and install Electrical Submersible pump 1.4kw at setting depth 10 meter below ground surface inside the pump house (UPVC screen); the pump should meet the following requirements:

* The pump should have enough head and ability to pump, 4000 liters of water per-hour through 2 inches high density polythene pipe, from the setting depth (10 meter below ground surface) to the elevated tank at 230 meters away from the well source and 65 meters higher than the water well elevation.
* The pump should be equipped with sensor to automatically break the electric current and top the pump if the water level draws down below and exposed the pump.
* The rising main from the pump to the ground surface should be of galvanized pipe or stainless-steel pipe.
* The outlet of the rising main at well source should be equipped with nonreturn and gate valves.
  1. Provide and install high density polythene pipe of 2 inches diameter total length 962m to connect the discharge point, at the well level, with the galvanized (GL) pipe connecting the inlet of the elevated water tank length pipe 230m, return line using (T-check) 3”\*2” to distribution point length 132m and from reducer connection point 3” \*2” up to health facility length 600m.
  2. Provide and install high density polythene pipe of 3” diameter total length 200m to connect with descending galvanize pipe 3” outlet from elevate water tank to be join with pipeline 2” using reducer 3” \*2” which is extent to health facility.
  3. Excavate trench of one 1 meter depth and 230 meters long extended from the water well to the elevated water tank for installing of the water pipe, 132m from elevate tank to distribution point; the rough portion of trench should be backfilled with 15 cm-thick soft soil layer under the pipe and 25 cm-thick layer above the pipe then complete back filling of the remaining portion with the cutting excavated from the trench or alternative suitable soil materials; in addition to 800m from elevated water tank to heath facility all these trench distance 1,162m will be excavated by CRS on contribution of community.

1. **Supply and Installation of Solar energy unit and fencing:** *(at long: E: 24”20.825 Lat: N 13”07.862 altitude 1695m).* 
   1. Provide and install complete solar energy unit with all accessories to properly operate the pump.

* The solar unit should be installed at the specified area 105 meters away from the water well.
* Solar panels should be installed on heavy duty steel or galvanized skeleton and elevated at least 3 meters above the ground surface to mitigate the risk of easy stealing of the panels.
  1. Provide materials and construct tight fencing (15m\*10m) around the solar panels and distribution point together using heavy duty steal or galvanized poles (Angles or pipes) 3 meters high with spacing 2 meters or less, and barbed wire equipped with door and locks *(the fencing area depend on the size of the solar unit that fit the selected pump mentioned on above article 2.1)*.

1. **Supply and Installation of steal water tank** **and tower and fence**: *(at Long: E 24”20.806 Lat: N 13”07.792 Altitude 1730m)*
   1. Provide and install cylindrical steal water tank made of mild steel plates, of capacity 15000 liters, *placed on steal tower 3-meters height*, with the main requirement including, *but not limited to*, the following:

* The bottom plate should be 6 mm thick, the side plate 5 mm and the top cover 4 mm thick.
* Paints: The tank shall be painted with antirust prime coat. Two other coats shall be applied as follows. a) Internal coating shall be of bituminous non-toxic paint. B) External shall be painted with silver coating of approved oil paint.
* The inlet connected to the supply pipeline with galvanized pipe 2 inches diameter.
* The outlet connected to the distribution pipeline with galvanized pipe 3 inches diameter.
* The water tank should be equipped with water level indicator with ladder to support chlorination process.
* Water level indicator shall be coated with white background and red graduations.
* Water tank should be disinfected before starting the supply of water to the consumers.
* Construct and installation fence around elevated water tank (10m\*10m) with door equipped supported by lock.
  1. Fabricate and erect steal tower of 3 meters height according to standard specification and guideline of Public Water Corporation (PWC).
* Casting of reinforced concrete foundation for the supporting tower.
* Foot plate and top plate thicknesses shall not be less than 16mm.
* Holding down bolts, nuts and washers shall be supplied complete with adequate sizes but not less than 16mm and 4 anchor bolts are decided to be used per footing.
* The supporting tower should be fixed on the foundation using the anchor bolts after the concrete attains its full strength after 10 days of concrete placement.
* Tower shall be painted with antirust prime coat, and bituminous black paint.

1. **Supply and Install distribution pipeline:**
   1. Supply and install high density polythene pipeline of 2” diameters to distribution point and 132 meters length to connect through (T-check) 3” \*2” with transmission pipeline 3” diameter descending from the elevated tank.
   2. Connect extension of 2”-diameters, 600 meters long high-density polyethene pipe connect with the pipeline 3” descending GI pipe from elevated tank with control valve to supply the Health Facility existing storage tank.
   3. Digging 1 meter-depth and 800 meters-long trench to accommodate the pipeline from the elevated water tank to the health facility (HF) storage tank.
   4. Back fill the rough section of the trench bottom (i.e. the portion with stone) back fill with fine soil from the bottom up to 150 mm thick.
   5. Lay the pipeline in the trench and backfill with soft materials up to 250 mm above the pipe then backfill the remaining portion of the trench up to the top i.e. ground surface with the cutting excavated from the trench or other available suitable source.
2. **Construction of tap stand:** (at *Lon****:*** *E 24”20.825 Lat: N 13”07.862 Altitude 1695 m)* 
   1. Construct tap stand of 12 taps connected to 2” GL pipe equipped with gate valve, installed on platform built of red bricks, and cement-sand mortar. The planned location is 132 meters apart from the main water pipe.
   2. The platform construction: The foundation of the platform should be of minimum 1.5 m width, 3 m long, and (0.3 m to 0.5 m) depth. The height of the platform 0.6 m, with 1.25 m height of the tap stand.
   3. Provide and cover the top and sides of the platform with white tiles.
   4. Provide plumping materials and connect the tap stand with the water main line with 2” size high-density polythene pipe.
   5. Construct 2 meters high fencing (15m\*10m) around the tap stand including solar panel unit has partition between them with good quality wire mesh and 2” heavy Ukrainian steel angles, and door 2 m\*2 m supported by lock.
   6. Construct the floor of concrete slap 10 cm thick.
   7. Construct animal trough sized 0.6\*0.6\* 10 meters long outside the fencing area and drainage ditch from the tap stand to animal trough.

**Bill of quantities and quotation:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No | Item Description | Unit | Q’ty | Unit price | Total price |
| 1 | **Rehabilitation of hand dug well** | | | | |
| 1.1 | Remove existing cover and build and raise the top of the lining above ground surface by additional one meter should be built of red bricks and/or stones and cement-sand mortar. *(the diameter of the well is 2.25 meters)* | Job | 1 |  |  |
| 1.2 | Construct a tight well-cover of reinforced concrete slab with a manhole (60cm\*60cm) should be equipped by lid with lock to enable future cleaning and maintenance of the well. The reinforced cover of the manhole should be tight and leakage proof. In addition of install hand pump body in middle of reinforced concrete cover for accommodate UPVC with submersible pump. | job | 1 |  |  |
| 1.3 | Installing 2 steel beams at the top of the well to support the concrete cover, pumphouse casing, and hold the pump. | job | 1 |  |  |
| 1.4 | Install pump house, UPVC pipe and screen, from the top to the bottom of the well with diameter within range from 5 to 8 inches to properly fit the bowl size of the selected pump and allow suitable clearance for safe installation and retrieval of the pump. The top 6 meters of the casing and 2 meters at the bottom of the casing should be of blind (plain) casing and the portion in between should be of original UPVC screen of slot size range 0.04-0.06 inch | m | 20 |  |  |
| 1.5 | Clean the lining wall by using suitable long-handled wire brush to remove the algae and other dirt layers, then wash with high pressure water jet | job | 1 |  |  |
| 1.6 | Clean the bottom of the well, remove the sludge and all materials deposited inside the well at the bottom until all the original total depth is cleaned i.e. to remove at least 3.10 meters-thick layer of deposits from the bottom, to increase the current free depth from 12.90 m to 16 m (original depth). | job | 1 |  |  |
| 1.7 | Dewater the well until the turbid water completely discharged out and the turbidity level around 5 NTU unit or less | job | 1 |  |  |
| 1.8 | Disinfect the well with high (concentration) chlorine dose applying shock chlorination processes according to the standard steps for chlorination. | job | 1 |  |  |
| 1.9 | Dewater the well and measure the residual chlorine | job | 1 |  |  |
|  | **Sub-total (1)** | | | |  |
| 2 | **Supply and Installation of Submersible pump** | | | | |
| 2.1 | Import and install GRUNDFOS Electrical Submersible pump (complete with accessories) at setting depth 10 meter below ground surface inside the pump house (UPVC screen); the pump should meet the requirements mentioned above. | no | 1 |  |  |
| 2.2 | Supply and install of SP 9-13, Grundfos submersible pumping device with sensor or any equivalent pump of an approved brand with the following technical characteristics: average flow rate of at least 4m3 with a Head of 65 m |  |  |  |  |
| 2.3 | Supply and install RSI 3x208-240V IP66 1.4kW 18A INVERTER |  |  |  |  |
| 2.4 | Supply and install OTDCP16, Switch disconnector, 16mA |  |  |  |  |
| 2.5 | Supply and install OVR PV 40-1000 P, overvoltage protection |  |  |  |  |
| 2.6 | Supply and lay all electrical cables 125m (4x6mm2 flat drop cable) plus accessories from borehole head works to control panel –preferably Grundfos model. |  |  |  |  |
|  | **Sub-total (2)** | | | |  |
| 3 | **Supply and Installation of Solar energy unit and fencing** | | | | |
| 3.1 | Provide and install complete solar energy unit with all accessories to properly operate the pump.  *(The solar unit should be installed at the specified area 105 meters away from the water well.*  *Solar panels should be supported with heavy duty steel or galvanized skeleton (5m\*4m area at 15 degree) and elevated at least 3 meters above the ground surface). Earth connection, TH cable 6mm2 green, yellow.* | set | 1 |  |  |
| 3.2 | Provide materials and construct tight fencing (15m\*10m) around the solar panels and distribution point with partition in between them using heavy duty steal or galvanized poles (Angles or pipes) 3 meters high with spacing 2 meters or less, and barbed wire equipped with door and locks (the fencing area depend on the size of the solar unit that fit the selected pump mentioned on above article 2.1). the partition between panel and distribution point also has door (2m high\*1m width) for allow guard for operate system. | job | 1 |  |  |
|  | **Sub-total (3)** |  |  |  |  |
| **4** | **Supply and Installation of steal water tank** **and tower** | | | | |
| 4.1 | Provide and install cylindrical steal water tank made of mild steel plates, of capacity 15000 liters, thicknesses 6mm for the bottom 5mm for side wall and 4mm for the top cover placed on steal tower 3-meters height, with accessories and the main requirement including, but not limited to what specified in scope of work hereabove. | job | 1 |  |  |
| 4.2 | Provide materials, fabricate, and erect steal tower of 3 meters height supported by ladder with bearing capacity of 20 tons to curry 15 cubic meter steel tank according to standard specification and guideline of Public Water Corporation (PWC).  Including but not limited to specification in the scope of works hereabove. | job | 1 |  |  |
|  | **Sub-total (4)** | | | |  |
| **5** | **Supply and Installing distribution pipeline 3” \*2” diameter** | | | |  |
| 5.1 | Supply and install high density polythene pipeline of 2” diameters length 230 meters and connect with the GL pipe ascending from well source to the elevated tank. | m | 230 |  |  |
| 5.2 | Supply and connect a 3”-diameters, 200 meters long high-density polyethene pipe connect with descending outlet GI pipe of tank to supply water to the storage tank existing in the Health Facility (clinic) equipped with control valve, join with 2” polythene using reducer 3” \*2” trend to health facility. | m | 200 |  |  |
| 5.3 | Supply and connect a 2”-diameters, 600 meters long high-density polyethene pipe connect through reducer with pipeline come from elevated tank 3” to supply water to the storage tank existing in the Health Facility (clinic). | M | 600 |  |  |
| 5.4 | Supply and install brunch line of high-density polythene pipeline (controlled by valve) of 2” diameters length of line 132 meters to distribution point and connect with T-check fitting 3”\*2” at transmission pipeline descending from the elevated tank. | M | 132 |  |  |
| 5.5 | Digging trench 1 meter-depth and 1,162 meters-long to accommodate the pipeline from well water source, to elevated tank then from elevated tank the storage at health facility (HF) and brunch trench to distribution point. This will provide by CRS on collaboration with community. | m | 1162 |  |  |
| 5.6 | Back fill the rough section of the trench bottom *(i.e. the portion with stone)* back fill with sand or fine soil from the bottom up to 150 mm thick. This will provide by CRS on collaboration with community. | m | 1162 |  |  |
| 5.7 | Lay the pipeline in the trench and backfill with soft materials up to 250 mm above the pipe then backfill the remaining portion of the trench up to the top i.e. ground surface with the cutting excavated from the trench or other available suitable source. This will provide by CRS on collaboration with community. | m | 1162 |  |  |
|  | **Subtotal (5)** | | | |  |
| 6 | **Construction of tap stand** | | | |  |
| 6.1 | Provide complete set of plumping materials and fittings for construction of tap stand of 12 taps connected to GL pipe equipped with gate valve. | set | 1 |  |  |
| 6.2 | Construction of the platform: the foundation of the platform should be of minimum 1.5 m width, 3 m long, and (0.3 m to 0.5 m) depth. The height of the platform 0.6 m, with 1.25 m height of the tap stand. | job | 1 |  |  |
| 6.3 | Provide and cover the top and sides of the platform with white tiles. | job | 1 |  |  |
| 6.4 | Provide plumping materials and connect the tap stand with the water main line with 2” size high-density polythene pipe. | job | 1 |  |  |
| 6.5 | Construct 2 meters high fencing around the tap stand with good quality wire mesh and 2” heavy duty Ukrainian steel angles, and gate door 2 m\*2 m for accommodate (tap stand & solar panel) as mention in article (3.2) above. | job | 1 |  |  |
| 6.6 | Construct the floor of concrete slap 10 cm thick | job | 1 |  |  |
| 6.7 | Construct animal trough sized 0.6\*0.6\* 3 meters long outside the fencing area and 10m drainage ditch from the tap stand to animal trough at North site. | job | 1 |  |  |
|  | Any other addition(s) proposed by the vendor. |  |  |  |  |
|  | Sub-total (6) | | | |  |
|  | **Grand Total\*** | | | |  |

*\*The final cost of the work will be adjusted to the actual work done and materials provided, verified, and approved by the CRS field officers.*

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| Vender Name: Signature: Date: |
| Stamp |