

**TERMS OF REFERENCE FOR DRILLING OF BOREHOLE**

**Location: Amme Village, Nimule Payam, Magwi County**

**Project:** Emergency Integrated Health and WASH services for vulnerable people affected by conflict and natural disaster in Magwi County

**Job Title:** Drilling of One (1) Bore-hole

**Background**

Fondation Caritas Luxembourg is an International Non-Governmental Organization operating within Eastern Equatorial State, and central Equatorial State. For the last 20 years, Fondation Caritas Luxembourg has been working in close collaboration with the Catholic Diocese of Torit (CDOT) nowadays referred to as “Caritas Torit” in the implementation of humanitarian and development projects in Eastern Equatoria State.

After establishment of a joint office Torit in 2006, we initiated collaboration with different State ministries and authorities e.g. the Ministry of Housing and Public Utilities; of Agriculture and Forestry; of Animal Resources and Fishery; of Local Government and Law Enforcement. Since then, Fondation Caritas Luxembourg has been engaged in construction of schools, health and sanitation facilities, provision of scholastic materials, construction of water systems, building the capacity of local institutions and staffs, food security and relief activities.

Fondation Caritas Luxembourg is planning to drill and motorize one borehole at Nimule near Anyama River under one of our emergency project “Emergency Integrated Health and WASH services for vulnerable people affected by conflict and natural disaster in Magwi County” as analysed below:

**1. Scope of Work:**

The drilling and Solar system installation work is expected to be implemented in Magwi County, in Nimule Payam, Amme village:

S/no	Location / village	Boma	Payam	County	Distance from Nimule Town to the Village
1	Amme	Nimule	Nimule	Ikwoto	3KM

**(a) Geophysical Survey/Profile Taking**

The selected company is expected to carry out geophysical survey before drilling commences, study is expected to use both secondary and primary data in the exercise; Secondary data will involve desk study of available information/data on existing boreholes in the area, drill logs,

reports and maps. The outcome of the study and recommendations is to be shared with Fondation Caritas Luxembourg before commencement of drilling work starts.

**The geophysical investigations will be carried out in a multi-step approach:**

- a) Desk study: Review of existing data, topographical maps, satellite images, existing studies and borehole site investigations in the area, geological reports and maps (if available), borehole and surface water records, etc.
- b) Findings.
- c) Compilation, analysis, and evaluation of the gathered data and information.
- d) Site selection and reporting.

**(a) Borehole Siting:**

The field investigations MUST be undertaken by a senior Hydrogeologist, assisted by highly qualified hydro-geologists. The senior hydro-geologist will be responsible for planning, execution and interpretation of all geophysical data, reporting and selection of the most suitable site for the drilling. The most promising site selected for drilling shall be marked with a concrete marker and indicated on a sketch map. The recommended site identified has to be well communicated to the community and the community should agree on the site first before drilling operation starts. Any geological difficulty arising making proposed sites by the community not suitable for hydrogeological reasons such that the promising sites falls outside the preferred one by the community, all reasons for such changes shall be clearly communicated to the community and ensure they understand and agree on that.

**(b) Bore Well Drilling Requirements**

The drilling of the borehole should be carried out according to the characteristics of the soil formation of the site, as per result of the hydro geophysical survey while using proper drilling tools, drill pipes, casing pipes with centralizers to ensure that casing string is central within the hole.

- The expected bore well diameter is 8inche
- The expected depth of the bore well is between 90m to 120m
- The expected yield of the bore well is a minimum 3,500 litres/hour.

**Screen casing**

- Factory made UPVC slotted 6 inches nominal internal diameter screens will be used throughout the aquifer zone. The slot size and screen length will depend on the aquifer materials and aquifer thickness placed at appropriate positions and depth. Screens should be of an ISO standard and having the specification UPVC class 9/10 drinking water standard non- toxic.

**Plain casing**

- 6Inches nominal internal diameter casing should be of ISO standard UPVC class 10 drinking water standard, 3 meters long with threaded joints, well screwed, appropriately placed in the correct positions in the well.

## **Permanent casing**

- plain casing of 8 inches diameter Permanent casing must go up to 6 m or up to hard formation to ensure that it seals off all materials from surface runoff entering the well and sanitary grout is inserted to a depth of not less than 1.50m from ground level.

## **Development**

- on completion of drilling, an appropriate development method will be applied this can include continuous flushing for a period not less than 6 hours, meanwhile estimating the discharge rate. This is necessary to obtain the maximum yield of the well.

## **Gravel packing**

- Gravel packing material shall be supplied and install all along the filter (aquifer) section of the well. The material shall be 2mm – 4 mm diameter, clean, well rounded siliceous gravel with not more than 5% of non- siliceous materials. Sanitary seal should be installing at an appropriate depth using recommended grout materials.

## **Pumping test (Including Recovery test)**

- Pumping test will be for a period not less than 12 hours in which the first 4 hours is for step draw down and 2 hours for continuous test. The discharge at this point will correlate to the discharge during flushing.

## **Recovery test**

- Recovery test should be done for at least 2 hours or such time when there is at least 80% of the static water level noted. The result for the pumping test should guide in determining the capacity of the pump appropriate for the well.

## **Water Quality Analysis**

- Water quality test (Chemical and Bacteriological) to be conducted at the end of the drilling to determine the status of the water, considering all the parameters recommended for testing. Ensure borehole is chlorinated before opening to users.

## **Bore-hole Installation:**

- Successful borehole will be installed with either Indian MK II Solar pump.
- All platforms (aprons) should conform to South Sudan standards from Ministry of water resources and UNICEF.
- The borehole within shortage time will be upgraded to Solar system, therefore no need for drainage channels to be constructed.

## **2. Objectives:**

- To ensure that, one borehole successfully constructed, solar pump well fixed and ensure the boreholes produces good amount and quality of water as required.

### 3. Tasks and expected days of work

- The contractor is expected to carry out the job accordingly, while assigning specific and clear task of works to specific team group e.g the hydrogeologist for geophysical survey, well logging and aquifer behaviour, water engineer / technicians for test pumping and installation of hand pumps, drillers for good drilling operations .The whole work is expected to take 7 days including mobilization to and from the site.

### 4 Reporting

- Contractor to report on each phase of work successfully completed, this includes:
  - ✓ Phase (1) Preliminary report of geophysical surveys work conducted on the one proposed site
  - ✓ (2) drilling completed and test pumping done
  - ✓ (3) Motorized solar pump installation.

### 5 Handing over

- Final inspection will be jointly conducted with the directorate of rural water supply and sanitation, community representatives' various components of the borehole will be inspected and verified, according to the check list. In case of defaults in any component, has to be rectified before final handing over is done.
- After the facility is handed over, Fondation Caritas Luxembourg will carry out post construction monitoring for a period of three months before the liability (retention) money is settled.