

**Terms of Reference for a Hydrogeological Investigations and  
Geophysical Survey, LasAnood Water Supply Project, Ministry of  
Water Resources Development MoWRD - P101-042**

## **1. Background to SDF2**

The Somaliland Development Fund (SDF) was established in 2012 to provide a single vehicle through which development partners could support Somaliland's development goals. The first phase of the SDF was implemented in 2013-2017 and supported the Government of Somaliland (GoSL) filling a critical gap through funding projects that are fully aligned to the National Development Plan (NDP) while at the same time recognizing the role of GoSL in the delivery of basic services.

The Somaliland Development Fund – Phase 2 (SDF2) covers the period 2018 – 2023. SDF2 is conceived as an inclusive economic development programme. It supports the GoSL in delivering infrastructure that is relevant for inclusive economic development. It focuses on sustainable investments that spur job creation and fast growth, while at the same time laying the foundation for long-term resilience and development, leading to a more stable and peaceful Somaliland. SDF2's ambitions are fully aligned with the NDP2 and reflect the priorities set out in Somaliland Vision 2030. Like in SDF1, all support will be aligned with government priorities as defined in Somaliland's second National Development Plan (NDP2) 2017-2022. BMB Mott MacDonald, is contracted by DFID as the Fund Manager. The Fund Manager is responsible for the day-to-day management and administration of the Fund.

The objectives of the SDF2 are threefold:

- Support increased inclusive economic growth through investment in productive, strategic infrastructure to enhance economic growth and revenue generation.
- Strengthen and maintain the capabilities of the government of Somaliland to prioritise and manage the sustainable and equitable development of Somaliland's infrastructure.
- Support strong government ownership of development priorities aligned with the National Development Plan.

## **2. Background to Project**

### **2.1 Ministry of Water Resources Development**

The Ministry of Water Development is mandated to ensure that Somaliland citizens have easy access to clean; adequate and affordable WASH facilities in a sustainable and environmentally friendly manner. Ministry's strategic purposes are: 1) development of underground and surface water resources, 2) improvement of regulatory framework and oversight of water sector and sustainable management, 3) strengthening capacity of MoWRD and its constituent bodies, 4) coordination and information management of WASH sector in Somaliland, and 5) mitigation of droughts and impacts of climatic and environmental changes to national water resources.

The Ministry of Water Development faces serious constraints to its capability to deliver services: limited availability of water resources, lack of infrastructure facilities and mostly inadequate existing facilities, associated with weak managerial, financial, and human resources necessary to extend reliable and safe services to the population. The limited institutional capacity of the Ministry, lower governance structures and water providers (whether public, private, communal or otherwise) are manifested in dysfunctional water supply schemes that keep relying on external support for operation and maintenance.

## **2.2 Las Anod Water Situation**

The centre of the town of Las Anod is located at a latitude of 8.475° and at a longitude of 43.76°. The elevation is about 700 m above sea level (ASL). The town extends in a basin drained by the stream passing about one kilometre southward and is encircled by a low hills crown. The area is located at the southern edge of the Nugal Valley which constitutes one of the major geographic features of the Northern Somalia, crossing both Somaliland and Puntland. Southward a higher and longer hill ranges divide the town plain from another plain gently descending toward Ethiopia.

From the hydrogeological point of view, the Las Anod area is characterized by the absence of fresh aquifers, both shallow and deep. The reason is the presence of a geological unit known as Taleex formation, widespread in the whole north-eastern Somalia, constituted mostly by gypsum and anhydrite which give to the water a high saline content. The southern side of the southern hill range is constituted by the Karkar formation, which overlays the Taleex formation, made of marls and limestones, the former more abundant in the lower section. Southward the limit between the units runs near the watershed of the southern hill range, very close to the town. Southeast and southwestward the watershed is almost made by the edge of the Karkar-limestones slightly sloping southward. Several hills of the Karkar formation spread in the area surrounding the town and for the most constitute erosive relicts, under which the Taleex formation lies at shallow depth.

The present town's water need is satisfied mostly through water tracking carrying water collected in the traditional structures called berkads, which are lined basins collecting the water running during rain, or collected by the shallow wells, excavated in the togga near the town, characterized by water of a medium salinity, worsening in the dry season. There is only a borehole, about 30 km north eastward at Gambadhe, which gives a small amount of water (about 20 m<sup>3</sup>/day) of medium salinity.

## **2.3 Las Anod Comprehensive Water Study (2015-2016)**

With an overall aim of supplying adequate and drinkable water to satisfy the present and the future needs of Las Anod town, SDF-MoWRD initiated comprehensive water study and preparations of preliminary designs for Las Anod town which commenced mid-October 2015. The proposed activities meant to establish reliable information on the potential and economically viable water resources in Las Anod area and preparations of preliminary designs, preliminary cost estimates, etc... thus enabling the Ministry of Water Resources Development (MoWRD) to plan the necessary investment to supply drinkable water to Las Anod town. The Preliminary designs/assessments were completed around September 2016 and between late 2016 and late 2017 SDF-MoWRD implemented phase II of the project, which is drilling of three (3) exploratory/production boreholes (1 in Tifafle, 1 in Adhi Adheyee and 1 in Gojade) – drilling reports for these are available with MoWRD and SDF.

From 2017 until end of December 2018 SDF-MoWRD engaged short/long term experts in preparing detail designs of Las Anod Water Supply System but the design work was interrupted repeatedly due to conflict/resistance from community. In fact, the biggest Dam (Goosin) and drilling of 9 boreholes in Tifafle were abandoned due to resistance from the local community.

SDF and MoWRD have decided to resume Las Anod study/design works and implementation of the proposed activities like drilling of boreholes through SDF2 funds.

### **3. Scope of work**

The objectives of the consulting services are:

- A) To conduct hydrogeological investigations and geophysical surveys in 3 locations in Gojade area, Las Anod, that were identified by another consultant in 2015 and to prepare hydrogeological/geophysical investigation report, borehole drawings, bill of quantities, technical specifications and workplans as part of the bid documents for drilling of the 3 boreholes; and
- B) To further assess Las Anod area and conduct hydrogeological investigations and geophysical surveys to identify more borehole sites (as close as possible to Las Anod town) to supply the current and future population of Las Anod town (with a 25 years design horizon). i.e., Las Anod 2020 daily water demand is estimated to be around 2,156M<sup>3</sup>/day while the year 2045 daily water demand will reach be around 10,188M<sup>3</sup>/day. Therefore, we expect the STE to site around 10 boreholes assuming an average yield of 50M<sup>3</sup>/hr. This is our estimate and we expect the expert to advise SDF/MoWRD on the number of boreholes required. Based on the findings, the consultant/expert is expected to prepare geomorphologic and structural features of the area, hydrogeological/geophysical investigation report, borehole drawings, bill of quantities, technical specifications and workplans as part of the bid documents for drilling of the identified/proposed boreholes.

The Consultant 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, drill logs, reports and maps while primary data will be obtained by carrying out Hydro-geophysical measurements within the study area using the necessary hydro-geological surveying equipment. SDF/MoWRD expect the consultant to use the latest technology/available equipment in ground water exploration.

### **4. Key tasks**

In view of the above, the expert will implement the following activities:

- Work together with the Ministry of Water Resources Development at national and regional level and build on the previous hydrogeological studies in Las Anod;
- Compile all available geological, geophysical and hydrogeological data of Las Anod area;
- Conduct detailed assessment for availability of ground water in Gojade and other areas around Las Anod;
- Carry out electrical geophysical survey of the project area as required;
- Analyse all the above data to assess the ground water potential in Las Anod area;
- Select the most suitable locations for the proposed 3 boreholes in Gojade and additional borehole sites to be identified by the consultant;

- The consultant, based on the assessment and studies, shall provide SDF Secretariat / MoWRD detailed borehole designs, bill of quantities, work plans, and complete tender documents for each borehole;
- Assess the accessibility to the sites by drilling equipment and personnel and make recommendations for the prospective driller to follow;
- Compile and submit to SDF Secretariat/MoWRD a comprehensive report, profile curves for all VESs, which shall include relevant details of the above investigations as well as sound recommendations on drilling/ construction procedures etc; and
- Mark the potential borehole sites with metal rod placed on concrete.

## **5. Duration of Assignment**

The assignment will be expected to last for a maximum of 30 working days from the signing of the Contract.

## **6. Qualifications**

The expert foreseen for this assignment is a Hydrogeologist with the following qualifications:

### Qualifications and skills

- At least a Bachelor of Science Degree in Geology is required. Master of Science in Geology/hydrogeology or related field is an advantage;
- Demonstrated ability to use and interpret variety of geophysical instruments is required;
- Demonstrated excellent command of spoken and written English. Fluency in Somali will be added advantage; and
- Excellent interpersonal and diplomatic skills.

### General professional experience

- At least 10 years demonstrated experience in water supply field especially in ground water assessment, borehole design and drilling activity.

### Specific professional experience

- Minimum of 10 years conducting similar studies in Somaliland and/or East Africa. The consultant must demonstrate that he/she have conducted at least five similar assignments in the last 3 years with 80% drilling success rate;
- Knowledge and experience in Somaliland ground water resources assessment would be important.

The consultant is not allowed to subcontract execution of any part (s) of the project without express permission in writing from the Contracting Authority. The Consultant must work closely with SDF Secretariat /MoWRD and the relevant Local Authorities in Las Anod.

## **7. Reports and reviews**

Upon completion of the study the consultant will prepare and submit three (3) hard copies and editable electronic copies (in word, excel, AutoCAD, EPANET, Water CAD etc...) in 3 CDs to the

SDF Secretariat, Ministry of Water Resources Development and Project Management Team. PDF alone is not allowed.

The tentative timetable of completing the assignments is as follows:

<b>Report</b>	<b>By when</b>
Draft report	Twenty (20) days after commencement of the assignment
Final report	Thirty (30) days after commencement of the assignment

The outline table of contents of the final report will be as follows:

- Executive Summary
- Introduction, review of previous studies and environmental background
- Geology and hydrogeology (incl. Inventory of boreholes and other water points)
- Methods of investigations, including Geophysical Techniques
- Detailed resistivity /IP survey (Wenner & VES) to delineate the productive aquifer
- Aquifers potentials; sustainable yield & water quality
- Proposed drilling sites
- Proposed drilling methods and its applicability
- Conclusions.

## **8. Equipment**

No equipment is to be purchased on behalf of the Client/Contracting Authority as part of this service contract or transferred to the Contracting Authority or local counterparts at the end of this contract. The consultant is expected to either rent or bring his/her equipment to complete the consultancy assignment with all the necessary software installed. i.e., in his/her application, the consultant is expected to clearly indicate the type geo-physical and other equipment that he will use for this assignment.

## **9. Fees and Allowances**

- The successful candidate will be offered competitive daily fees. The fees will be paid on daily basis upon submission of final report, timesheet and an invoice.
- All fees will be paid after the completion and approval of the assignment final report.
- SDF Secretariat shall organise and pay for consultant accommodation and DSA as per SDF2 guidelines.

## **10. Duty of Care**

- The consultant will work under the overall SDF Secretariat Health, Safety and Security protocols of the SDF Secretariat;
- The consultant will be expected to provide insurance for health care, accidents, and other risks associated to the assignment. The SDF Secretariat/MoWRD shall be free from any liabilities arising from the same;
- SDF will share available information with the Consultant on security status and developments in country where appropriate.

## **11. Other provisions**

- **Accountability:** The Consultant will report directly to SDF Secretariat (Team Leader) and will work on day - to – day basis with the Project Management Team at the Ministry of Water Resources Development, specifically the Project Manager;
- **Possession of sites:** SDF Secretariat/MoWRD will facilitate his missions to the field and provide the consultant with any available/existing documents about the site. In this case, the Project Management Team staff and other relevant technical staff in the Ministry of Water Resources Development will be available to work closely with the consultant;
- **Relevant documents:** The SDF Secretariat/MoWRD shall furnish all pertinent available data and information and give such assistance as shall be reasonably required by the Consultant in carrying out provision of this Agreement;
- **Duty post:** The work is to be performed in Las Anod, Sool region, Somaliland. Draft and final reports will be submitted in Hargeisa;
- **Personal Computers:** The Consultant is responsible for the provision of own personal computer and other relevant equipment; and
- The SDF Secretariat will be responsible for transport within Hargeisa and in the field.