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GEOPHYSICAL SURVEY REPORT
REF NO. 5
(JALLOH TERRACE-KUNTORLON)

SUBMITTED TO:
CONCERN WORLDWIDE-SL

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INTRODUCTION

other to improve the water supply for Jalloh Terrace and it's surroundings, Concern Worldwide-SL ntracted **EDAL** Drilling Company, to explore the possibility of getting ground water in this area. As rt of our operations, we therefore carry out a Hydrogeological and Geophysical investigations in ting the borehole position in the project area. These studies among others, provided enough data and formation used in assessing the possibility of striking groundwater in the project area.

his report documents the work carried out during the investigations at the site.

BACKGROUND / GEOLOGY OF PROJECT AREA

e project area lies within the Freetown Basic Complex. The Freetown Complex is formed mainly by saltic magmatism and outcrops can be found in the west as a result of younger igneous intrusions and osion. The Freetown Complex is a layered gabbroic anorthosite intrusion, emplaced gneisses and hist of the Kasila group. It forms part of the Peninsula and Banana Island. It is thought to have been rmed due to multiple injections of magma that occurred intermittently. However most of these rmations are obscured and overlain by hard compacted laterites and some sedimentary materials.

erefore, groundwater potential of the Freetown Basic Complex is found within fractured zones of these neous (crystalline) rocks. However, groundwater quality and quantity could be high if properly located rough the appropriate hydrogeological and geophysical investigations.

3. FIELD WORK

The field work was divided into two phases;

- Reconnaissance Survey; and
- Geophysical Survey.

3.1 Reconnaissance Survey

The aim of the reconnaissance survey was to select suitable area (s) for geophysical survey, considering the geological/Hydrogeological, environmental and other physical conditions.

The reconnaissance survey included the following:

3.1.1 Geomorphological Survey of the Area

This describes the landscape and other physical features on the project area. The project area is on an elevated-ground with an elevation of 148m above sea level and landscape is a dome-like shape. There were no in-situ outcrops in the immediate surroundings. Out crops can only be seen from a distance. The Geomorphology of the area suggested high ground water potentials.

3.1.2 Geological survey to determine the formation of the area and to identify possible Hydrogeological features

The project area is composed of laterites which resulted from the weathering of underlying gabbroic rocks. Area landscape with respect to rock type suggested groundwater at deep, but geophysical survey will aid in getting the best location.

3.2 Geophysical Survey

The Geophysical survey consisted mainly of Electrical Resistivity i.e. Vertical Electrical Sounding (VES) using ABEM SAS 1000 Terrameter Resistivity meter.

3.2.1 Selection of Traverse Line

The traverse line was selected on the basis of geomorphologic and physical features as well as Hydrogeological features of the area. There was no visible strike direction of the geologic formation of the area due to weathering and surface erosion.

Selected point for the Vertical Electrical Sounding (VES) was marked with a peg for identification.

3.2.2 Selection of VES points

The Vertical Electrical Sounding (VES) point was selected based on the site location and geological features.

3.2.3 Vertical Electrical Sounding (VES)

Vertical Electrical Sounding (VES) was carried out with the aim of determining the formation resistivities and the depth to bedrock, as well as finding the possibility of obtaining fractures at depth. The Schlumberger electrode configuration and the required procedures were used for the VES.

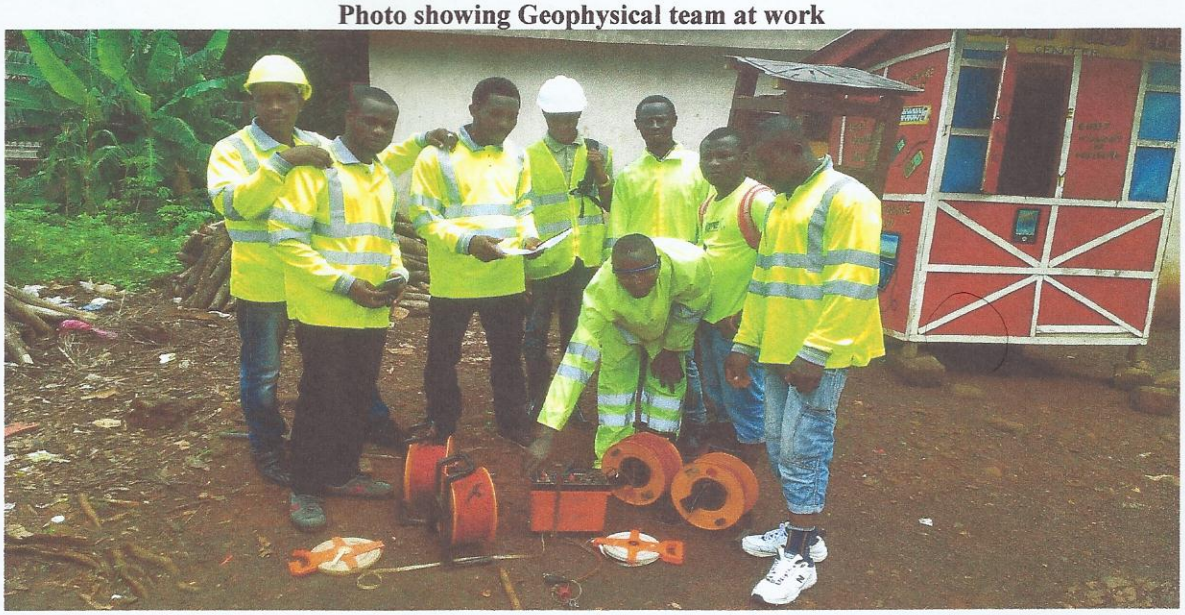
4. DATA ANALYSIS AND INTERPRETATION

The Vertical Electrical Sounding (VES) data and the corresponding curve are presented below:

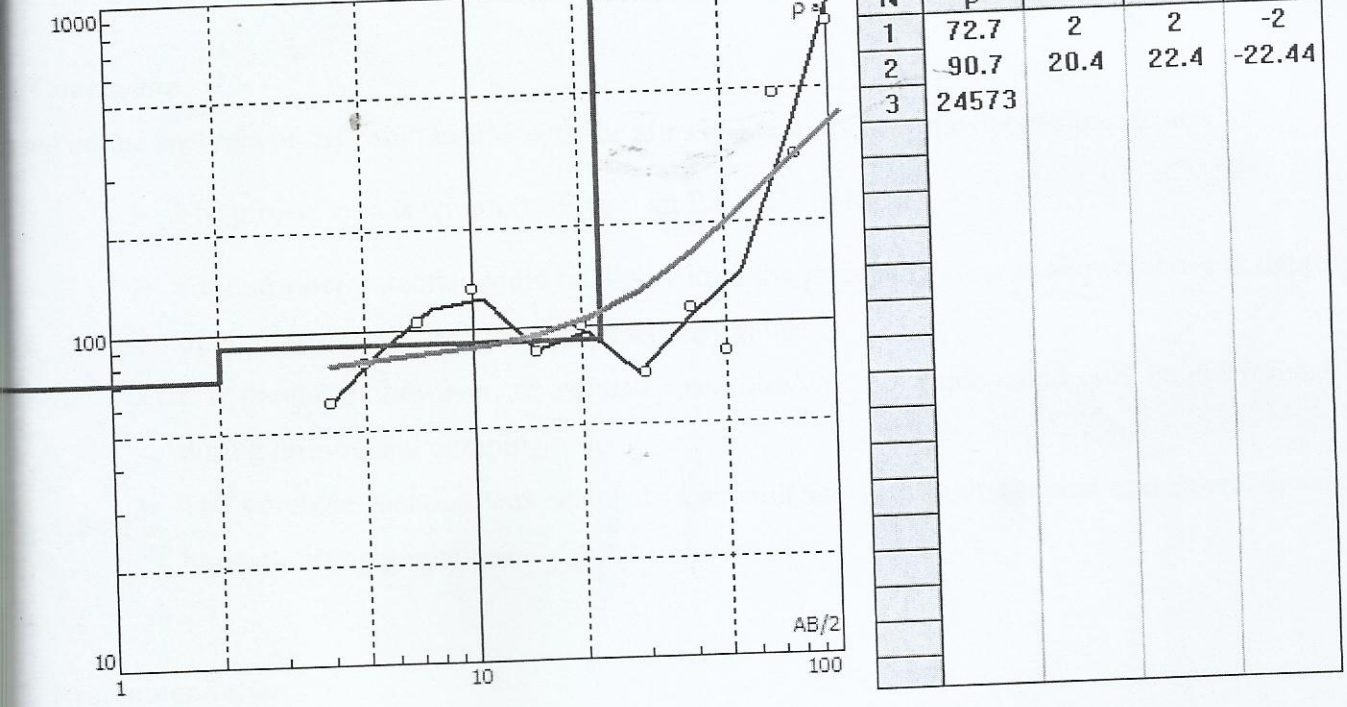
Table1: Schlumberger Array VES Data

Client: **Concern Worldwide-SL**			Community: **Kuntorlon**	
Project: **Geophysical Survey**			Sounding Number: **1**	
District: **Western Area**			GPS Coordinate East: **0699936**	
Date: **23rd September,2015**			GPS Coordinate North: **0935605**	
Field Operator: **Abdul Rahman Turay and James Kargbo**			Elevation: **148m**	
Schlumberger Array VES Field Data				
No.	**AB/2**	**MN**	**Resistance (ohm)**	**Apparent Resistivity (ohm-m)**
1	4	0.8	0.97906	60.91
2	5	0.8	0.81991	79.99
3	7	0.8	0.54577	104.69
4	10	0.8	0.62833	130.87
5	15	1.5	0.22219	84.56
6	20	1.5	0.11923	99.76
7	30	1.5	0.037718	71.06
8	40	1.5	0.16902	110.79
9	50	7.6	0.079816	82.02
10	70	7.6	0.23799	480.69
11	80	14	0.22019	313.85
12	100	14	0.35565	794.27

Photo showing Geophysical team at work



Schlumberger Array VES Curve and Model



N	ρ	h	d	Alt
1	72.7	2	2	-2
2	90.7	20.4	22.4	-22.44
3	24573			

Table 2: Selection of Promising Points from VES Data

No.	LAYER	THICKNESS (m)	DEPTH (m)	APPARENT RESISTIVITY (Ohm-m)	POSSIBLE WATER ZONES (M)	RANKING	MAX DRILLING DEPTH (M)
1	1 2 3	2 20.4 -	2 22.4 -	72.7 90.7 24573	20-50	Medium	80

It can be deduced from the VES data above that the maximum drilling depth should be 80m to cut through the first promising zone of 20-50m to ensure reliable productivity. However this depth may be exceed based on other sub-surface conditions.

CONCLUSION AND RECOMMENDATIONS

1 Conclusion

ased on the analyses of the result in line with the aims of the study, the drawn conclusions are;

- The project area is within the Freetown Basic Complex.
- Groundwater potential could be high within the promising zone as shown above at depth of 20-50m as indicated from the resistivity values.
- It is premature however, to estimate quantities/volume which could only be determined during drilling and pumping test.
- The borehole location was selected in accordance with both national and international borehole siting guidelines.

Recommendation

this regard, it is recommended that,

- Drilling could be carried out at the selected point to confirm the existence of groundwater.
- The maximum drilling depth should be 80m to cut across the first promising zone of 20-50m to ensure reliable productivity. However, the supervisor may exceed this depth based on other sub-surface conditions.
- Both physico- chemical and bacteriological tests should be carried out on the borehole water samples from the completed well.
- Borehole must be constructed using the correct and standard materials such as standard uPVC screens and plain casings, well sorted gravels etc. for water quality and high yield.

PORT SUBMITTED BY:

1st/10/15

logist / Field Operator
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