

# **BOREHOLE SITING REPORT**

FOR

**THE QUEEN MOTHER**

**BESORO- KUMAWU**

**ASHANTI REGION**

JESUS CARE VOLUNTARY C  
KUMAWU-BESORO PO BOX 22  
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**PREPARED BY**

**HITESH IMPEX GHANA LTD**

**P. O. BOX**

**ACCRA**

**JANUARY 2009**

**I BAMBINI DI BESORO-ASHANTI**  
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Canton Ments Accra (Ghana)

## ANNEX A

### A. FIELD DATA SHEET

### B. SCHLUMBERGER RESISTIVITY PROFILING

### C. SCHLUMBERGER RESISTIVITY SOUNDINGS

## 1. INTRODUCTION

The Queen mother of Besoro intends to drill a mechanized borehole for domestic use at Besoro near Kumawu, in the Ashanti Region of Ghana. Hydrogeological consultants from Hitesh Impex Ghana Limited were, therefore, engaged to carry out hydrogeological investigations for borehole site selection.

The objective of the studies was to employ the most appropriate hydrogeological investigation method to provide a promising site for borehole drilling within the community.

This report presents a summary of the results of hydrogeological investigations carried out within the community.

## 2. HYDROGEOLOGY

The project area is primarily underlain by sedimentary rocks such as sandstone, siltstone, mudstone, shale etc. Groundwater occurrence in such layered rocks is structurally controlled and this accounts for the drilling of low yielding boreholes in the project area. Groundwater is mainly found in fractures within the rocks and at the interface between one layered rock and the other.

## 3. METHODOLOGY

An intensive terrain evaluation, which sought to delineate areas of significant groundwater potential, was carried out.

One traverse was selected based on the observations considered above. The traverse was pegged at 10m-intervals. The intent was to map-out lineament trending across the project site and to enhance the chances of locating tight fractures.

Geophysical profiling involving electrical resistivity measurements was carried out at 10m intervals using the standard Laussane drag cable which is based on the Schlumberger electrode arrays of  $(L/2, a/2) = (19.0, 0.5)$  and  $(L/2, a/2) = (40.0, 5.0)$ . The profile plots are presented as appendix A.

On the spot interpretation of geophysical profiles was carried out to select suitable points for electrical resistivity sounding (VES). Two drilling points were selected on the basis of ground anomalies delineated from the geophysical profiles.

  
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Schlumberger Resistivity Sounding was carried out at the selected points to identify any existing aquifer zones, which can be targeted for exploitation by means of a borehole design. The data sheets are presented as Appendix A.


#### 4. SITE SELECTION (SOUNDING POINTS)

VES POINT	LAYER	THICKNESS (m)	DEPTH (m)	APPARENT RESISTIVITY (Ohm-m)	POSSIBLE AQUIFER ZONES (m)	MAXIMUM DRILLING DEPTH	RANKING
A10	1	1.2	1.2	140	8-52	60	1 <sup>st</sup>
	2	5	6.2	250			
	3	45	51.2	95			
	4	--	--	1200			
A70	1	2	2	250	8-38	60	2 <sup>nd</sup>
	2	6	8	200			
	3	30	38	90			
	4	--	--	500			

#### 4. CONCLUSION AND RECOMMENDATIONS

The hydrogeological investigations have revealed that there are deep-seated aquifers in the study area that can be targeted for drilling. The aquifer zones of the selected drilling points, that is, A10 and A70 are 8-52m and 8-38m respectively.

In view of these, drilling up to a maximum depth of 60m is recommended. It is also strongly recommended that hydrofracturing be done in the event of getting marginal borehole to open up the tight fractures.

  
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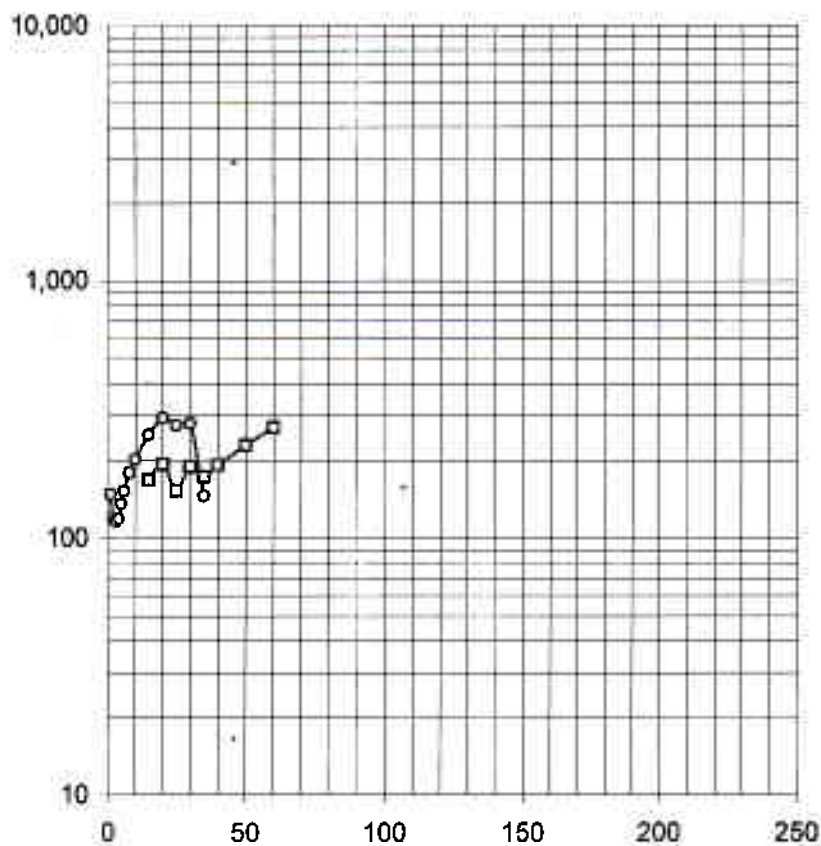
# Besoro - A10/S1

Client :	Community : Besoro
Project : Private	Sounding Number : A10/S1
District : Kumawu	Coordinates East :
Date : 29-01-2009	Coordinates North :
Field Operator : Richard	GPS Datum : GPS datum
Interpreted by : Richard	Azimuth : 250°

## Schlumberger Array VES Field Data

AB/2 (m)	MN(m) 1.0 (MN-1)	MN(m) 10 (MN-2)	MN(m) 50 (MN-3)	$\frac{\Delta V}{I}$ I (MN-1)	$\frac{\Delta V}{I}$ I (MN-2)	$\frac{\Delta V}{I}$ I (MN-3)	$\rho$ (ohm-m) (MN-1)	$\rho$ (ohm-m) (MN-2)	$\rho$ (ohm-m) (MN-3)
1.0	2.4			58.2000			137.1		
2.0	11.8			13.2600			156.2		
3.0	27.5			6.0700			166.9		
4.0	49.5			3.7700			186.5		
5.0	77.8			2.5400			197.5		
6.0	112			1.8520			208.0		
8.0	200			1.0650			213.3		
10.0	313			0.6640			208.1		
15.0	706	63		0.2240	2.7300		158.2	171.5	
20.0	1,256	118		0.1160	1.3320		145.7	156.9	
25.0	1,963	188		0.0700	0.7360		137.4	138.7	
30.0	2,827	275		0.0440	0.4550		124.4	125.1	
35.0	3,848	377		0.0260	0.2950		100.0	111.2	
40.0		495			0.2120			104.9	
50.0		778			0.1560			121.3	
60.0		1,123			0.1240			139.3	
70.0		1,532			0.1000			153.2	
80.0		2,003			0.0810			162.2	

  
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○ 1.0  
 □ 10  
 ▲ 50

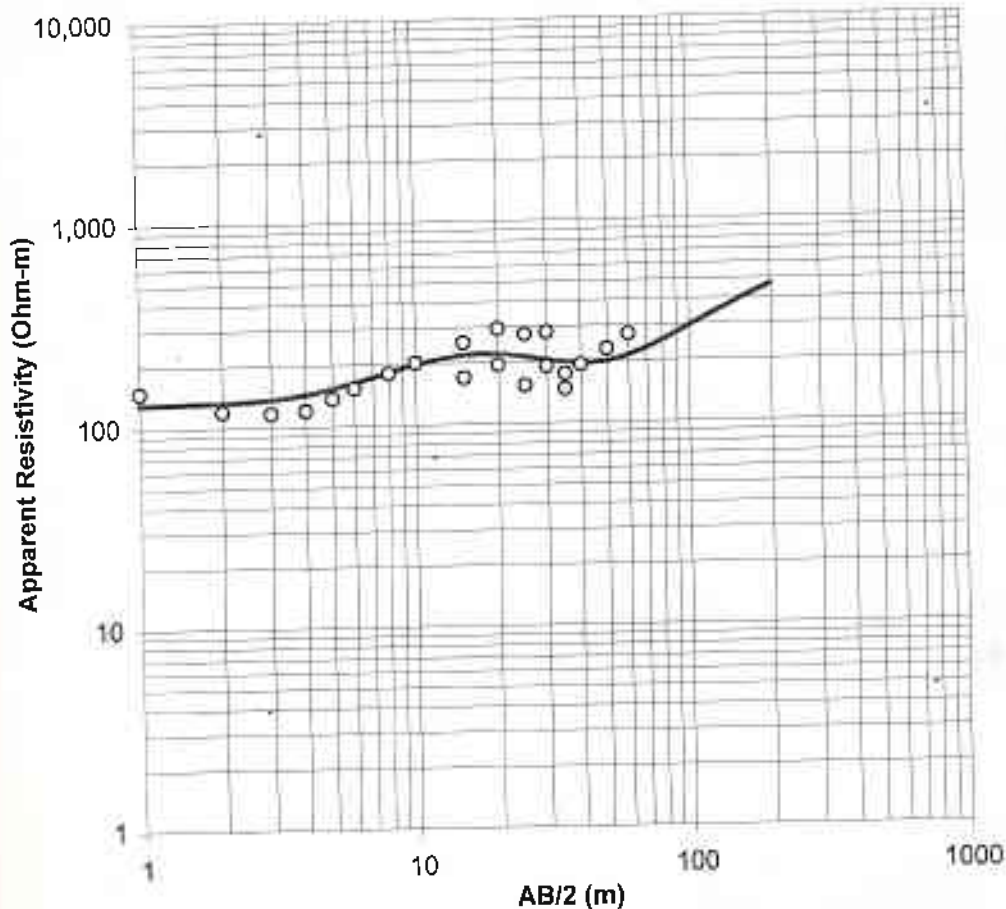
*[Handwritten Signature]*  
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# Besoro - A10/S1

Geoelectrical Model

RMS Error : 9

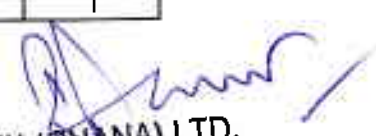
Layer Number	1	2	3	4	5
Resistivity (Ohm-m)	140	250	95	1200	
Thickness (m)	1.2	5.0	45.0		
Depth (m)	1.2	6.2	51.2		



Data		Hidden	Hidden	Model			
AB/2	(m)	Measured Apparent Resistivity (Ohm-m)	Measured Apparent Resistivity Not included	Measured Apparent Resistivity Included	Modelled Apparent Resistivity (Ohm-m)	Model Error	Included in Model (1=yes)
1.0		137.1	0.0	137.1	144	50	1
2.0		156.2	0.0	156.2	161	27	1
3.0		166.9	0.0	166.9	179	151	1
4.0		186.5	0.0	186.5	192	28	1
5.0		197.5	0.0	197.5	199	4	1
6.0		208.0	0.0	208.0	203	26	1
8.0		213.3	0.0	213.3	201	148	1
10.0		208.1	0.0	208.1	193	240	1
15.0		158.2	0.0	158.2	164	38	1
20.0		145.7	0.0	145.7	142	13	1
25.0		137.4	0.0	137.4	128	84	1

*[Signature]*  
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30.0	124.4	0.0	124.4	121	13	1
35.0	100.0	0.0	100.0	117	303	1
15.0	171.5	0.0	171.5	164	51	1
20.0	156.9	0.0	156.9	142	222	1
25.0	138.7	0.0	138.7	128	111	1
30.0	125.1	0.0	125.1	121	19	1
35.0	111.2	0.0	111.2	117	39	1
40.0	104.9	0.0	104.9	117	146	1
50.0	121.3	0.0	121.3	121	0	1
60.0	139.3	0.0	139.3	130	88	1
70.0	153.2	0.0	153.2	141	152	1
80.0	162.2	0.0	162.2	153	81	1

  
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