

## **8.4 SAHARTI SAMRE WEREDA**

### **Gebana**

Results for Gebana site are presented on Figure 5a. Prospect for groundwater at Gebana area seems good but may not be high yield. The relatively better location for drilling, where there seems to be a distinct potentially water bearing strata, is in the vicinity of VES-1 (target depths between 22 - 62m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 65m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 5a for UTM coordinates of the relevant VES points.

### **Weite Kezena**

Results for Weite Kezena site are also presented on Figure 5a. Prospect for deep groundwater at Weite Kezena area generally seems bad. Drilling at Weite Kezena is not recommended. However, constructing a hand dug well may be possible there. The relatively better location for a hand dug well, where there seems to be shallow and distinct potentially water bearing strata, is in the vicinity of VES-1 (target depths between 3 - 19m), and is recommended for borehole construction. The target depth should be intersected as much as possible during digging. Total depth of digging is recommended to be at least 20m. The top few meters of the well should be grouted and sealed after digging in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 5a for UTM coordinates of the relevant VES points.

### **Bereziba**

Results for Bereziba site are presented on Figure 5b. Prospect for groundwater at Bereziba area seems good but may not be of high yield. The relatively better location for drilling, where there seems to be a distinct potentially water bearing strata, is in the vicinity of VES-2 (target depths between 24 - 33m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 35m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 5b for UTM coordinates of the relevant VES points.

### **Adi Shishay**

Results for Adi Shishai site are also presented on Figure 5b. Prospect for groundwater at Adi Shishai area generally seems bad. Drilling at Adi Shishai is not recommended. Refer to either Table 3 or figure 5b for UTM coordinates of the relevant VES points.

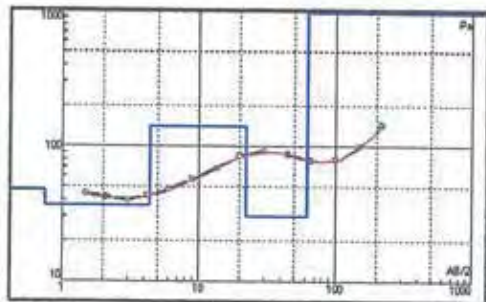
### **Gunfale**

Results for Gunfale site are presented on Figure 5c. Prospect for groundwater at Gunfale area seems good but may not be of high yield. The relatively better location for drilling at Gunfale, where there seems to be multiple potentially water bearing strata, is in the vicinity of VES-1 (target depths between 30 - 140m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 145m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 5c for UTM coordinates of the relevant VES points.

### **Kebarit**

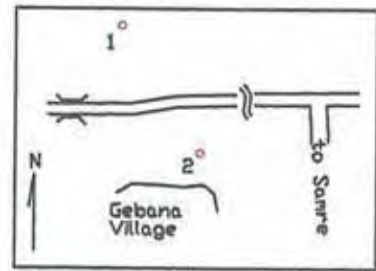
Results for Kebarit site are also presented on Figure 5c. Prospect for deep groundwater at Kebarit area generally seems bad. Drilling at Kebarit is not recommended. Constructing a hand dug well may however be possible there. The relatively better location for a hand dug well, where there seems to be shallow and distinct potentially water bearing strata, is in the vicinity of VES-2 (target depths between 5 - 11m), and is recommended for borehole construction. The target depth should be intersected as much as possible during digging. Total depth of digging is recommended to be at least 15m. Refer to either Table 3 or figure 5c for UTM coordinates of the relevant VES points.

	UTM-N	UTM-E	Elevation
Gebana 1	1447645	500543	1463
Gebana 2	1447287	500764	1474

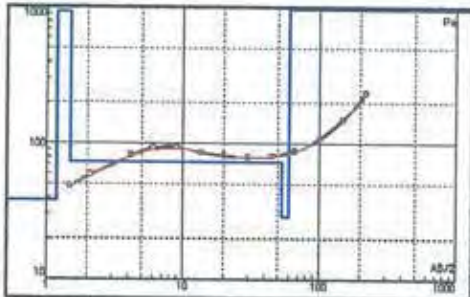


Ves-1

M	ρ	h	d	Alt
1	47.75	0.75	0.75	1462
2	30.7	3.617	4.367	1459
3	14.3	17.99	22.39	1441
4	30.62	39.83	62.19	1401
5	11870			

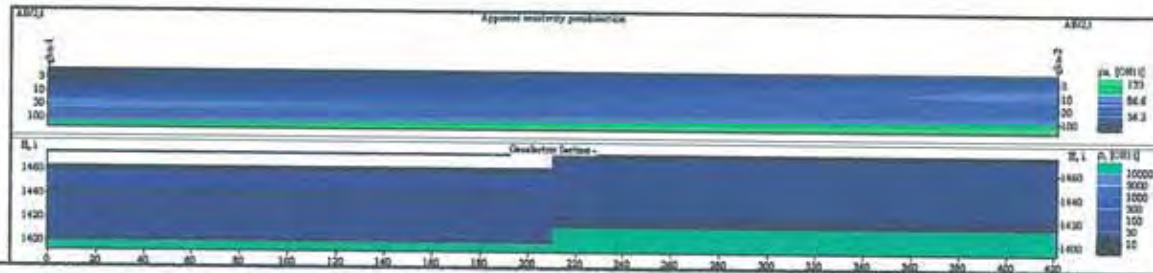


Gebana VES point location

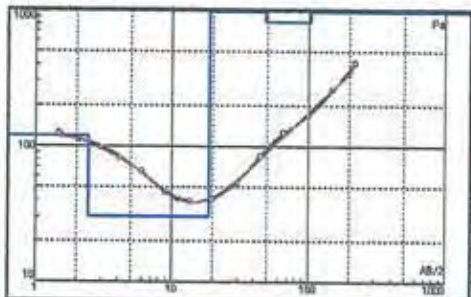


Ves-2

M	ρ	h	d	Alt
1	38.39	1.18	1.18	1473
2	936.9	8.3088	1.401	1473
3	73.98	51.44	52.92	1421
4	89.13	7.327	68.25	1414
5	33987			

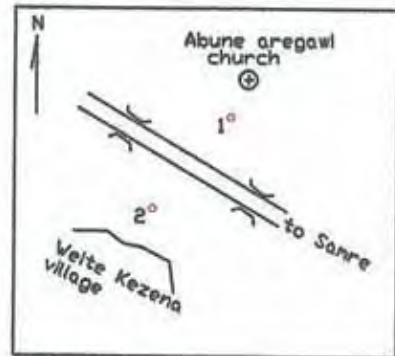


	UTM-N	UTM-E	Elevation
Wete kezena 1	1448400	504146	1507
Wete kezena 2	1448144	503928	1490

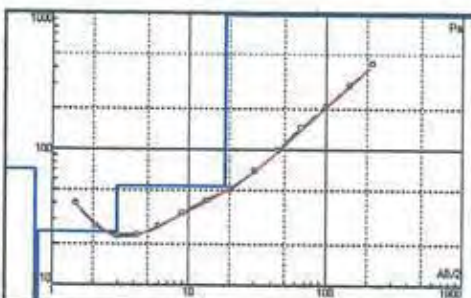


Ves-1

M	ρ	h	d	Alt
1	121	2.42	2.42	1505
2	39.7	16.3	18.7	1499
3	49844	29.3	88.8	1458
4	828	54.2	103	1484
5	4992			



Wete Kezena VES point location



Ves-2

M	ρ	h	d	Alt
1	70.95	0.75	0.75	1495
2	8.4776	0.02868	0.7787	1495
3	24.91	2.182	2.361	1487
4	54.21	15.53	18.49	1472
5	2577			

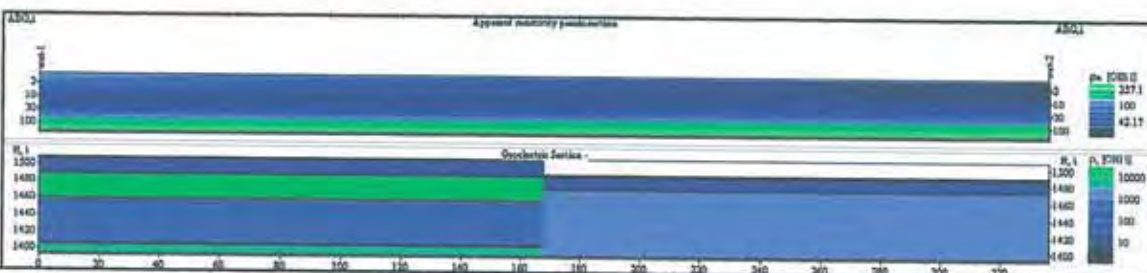


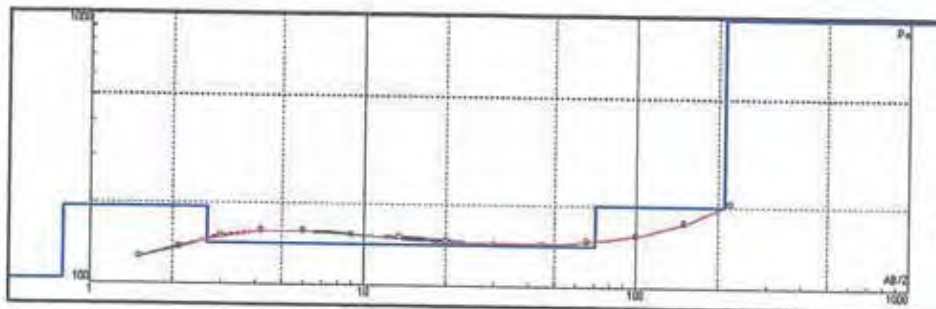
Figure 5a: Vertical Electrical Sounding results of Gebana & Wete Kezena sites (Saharti Same woreda).

UTM-N UTM-E Elevation

Berezeba 1	1460061	532588	2010
Berezeba 2	1460128	532668	1991

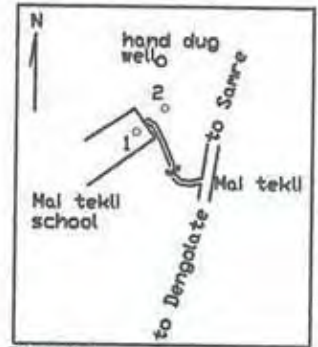
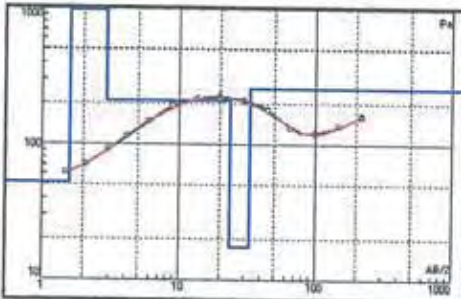
Ves-1

N	p	h	d	AB
1	104.7	0.7334	0.7334	2089
2	194	1.074	2.887	2087
3	142.3	88.28	70.35	1929
4	208.4	130.8	209.7	18
5	2017			

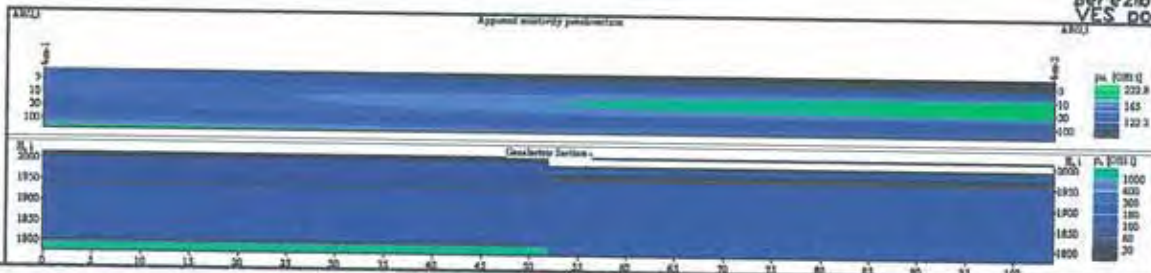


Ves-2

N	p	h	d	AB
1	62.63	1.584	1.584	1989
2	1215	1.362	2.948	1989
3	213.6	20.83	23.79	1967
4	17.68	9.332	33.11	1958
5	258.4			



Berezeba VES point location - access bad

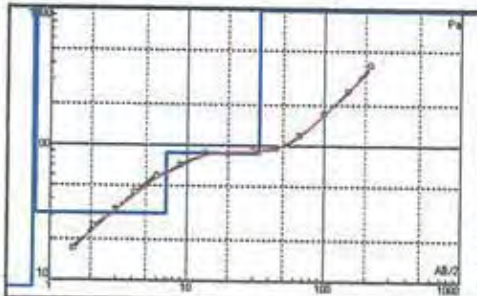


UTM-N UTM-E Elevation

Adi shishai 1	1483547	526062	1932
Adi shishai 2	1483467	524636	1840

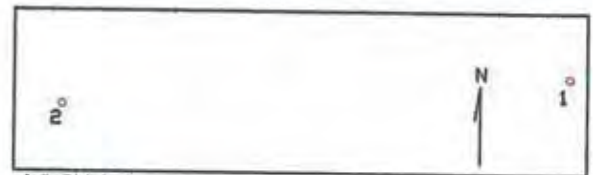
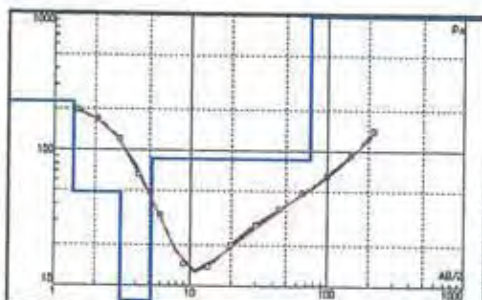
Ves-1

N	p	h	d	AB
1	9.06	0.75	0.75	1931
2	32951	0.8323	0.782	1931
3	31.8	6.25	7.83	1925
4	98.4	26.5	33.5	1838
5	27124			



Ves-2

N	p	h	d	AB
1	228	1.38	1.38	1839
2	48.3	1.68	3.08	1837
3	2.71	2.13	5.19	1835
4	87.3	69.3	74.5	1766
5	19787			



Adi Shishai VES point location - access by foot

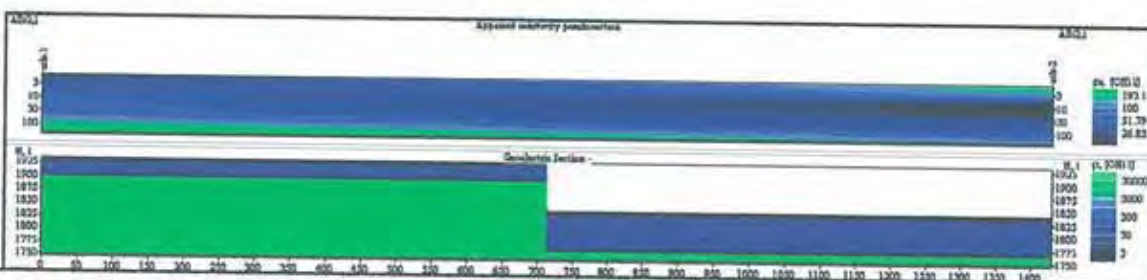
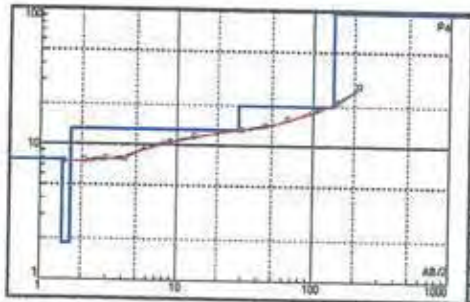


Figure 5b: Vertical Electrical Sounding results of Berezeba & Adi Shishai sites (Saharti Sawa wereda).

UTM-N UTM-E Elevation

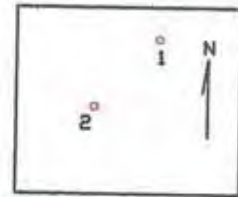
Gunfale 1 1474963 517588 2049

Gunfale 2 1474775 517407 2039

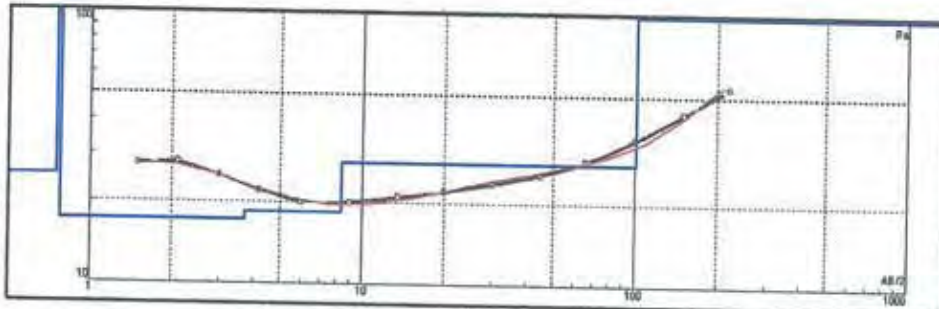


Ves-1

N	p	h	d	AB
1	7.781	1.437	1.437	2048
2	1.87	0.213	1.55	2047
3	13.23	26.87	20.52	202
4	18.92	112.2	149.7	1909
5	517.3			

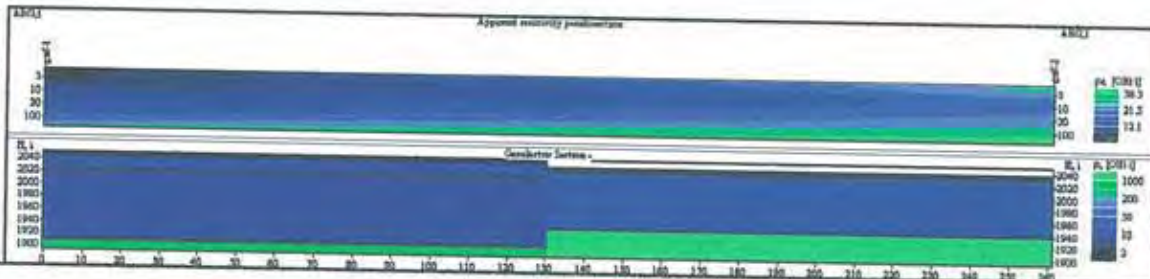


Gunfale VES point location



Ves-2

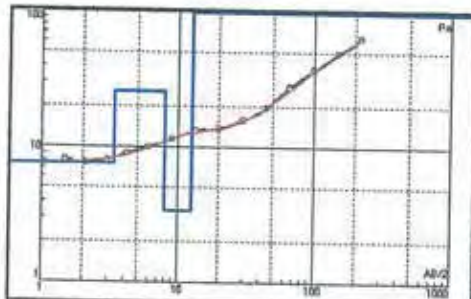
N	p	h	d	AB
1	25.2	0.76	0.76	2938
2	735	0.0233	0.773	2938
3	17.2	2.93	3.7	2935
4	18.5	4.66	8.36	2931
5	29.2	32.1	109	1939
6	2258			



UTM-N UTM-E Elevation

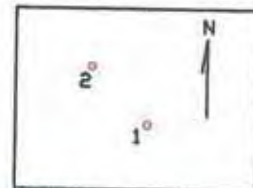
Kebarit 1 1478966 517925 2239

Kebarit 2 1479130 517769 2234

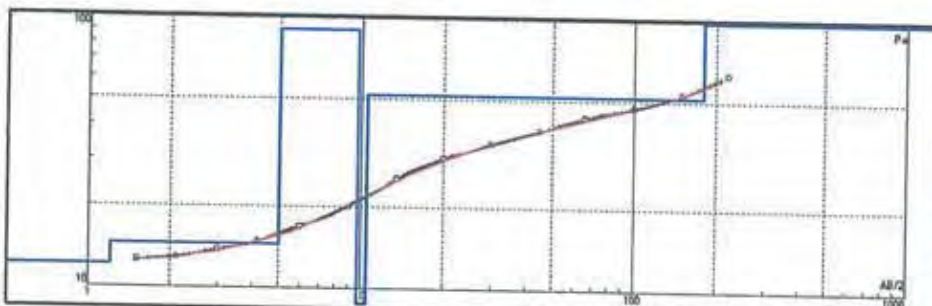


Ves-1

N	p	h	d	AB
1	7.607	3.388	3.388	2238
2	25.84	4.582	7.95	2231
3	3.428	4.558	12.51	2228
4	124			



Kebarit VES point location



Ves-2

N	p	h	d	AB
1	12.17	1.2	1.2	2233
2	14.52	3.017	5.017	2229
3	90.25	4.682	9.789	2224
4	3.25	6.7342	10.44	2224
5	52.07	169.2	179.6	2054
6	399.8			

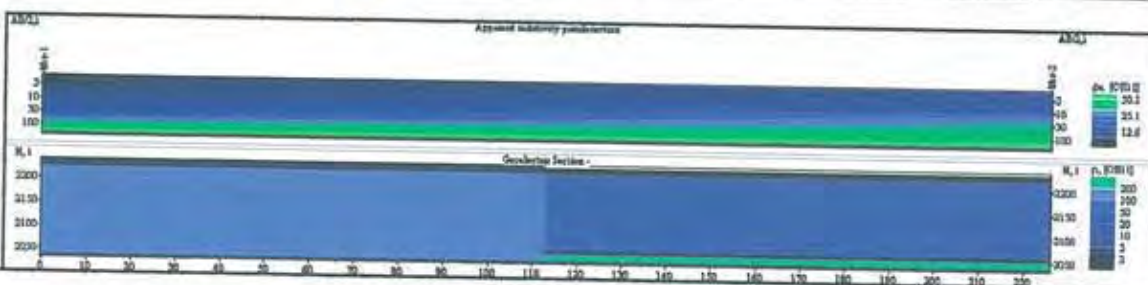


Figure 5c: Vertical Electrical Sounding results of Gunfale & Kebarit sites (Sabarti Sare wereda).

## 8.5 ENDERTA WEREDA

### Sewhi

Results for Sewhi site are also presented on Figure 6a. Prospect for deep groundwater at Sewhi area generally seems bad. Drilling at Sewhi is not recommended. Constructing a hand dug well may however be possible there. The relatively better location for a hand dug well, where there seems to be shallow and distinct potentially water bearing strata, is in the vicinity of VES-1 (target depths between 6 - 10m), and is recommended for borehole construction. The target depth should be intersected as much as possible during digging. Total depth of digging is recommended to be at least 12m. Refer to either Table 3 or figure 6a for UTM coordinates of the relevant VES points

### Mai Keyh

Results for Mai Keyh site are also presented on Figure 6a. Prospect for groundwater at Mai Keyh area seems good. The better location for drilling at Mai Keyh, where there seems to be a potentially water bearing strata, is in the vicinity of VES-2 (target depths between 16 - 35m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 45m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 6a for UTM coordinates of the relevant VES points.

### Kokahi

Results for Kokahi site are presented on Figure 6b. Prospect for groundwater at Kokahi area seems ok but may not be of high yield. The relatively better location for drilling at Kokahi, where there seems to be a possible water bearing strata, is in the vicinity of VES-2 (target depths between 31 - 49m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 55m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 6b for UTM coordinates of the relevant VES points.

### Adi Amik

Results for Adi Amik site are also presented on Figure 6b. Prospect for groundwater at Adi Amik area seems ok but may not be of high yield. The relatively better location for drilling at Adi Amik, where there seems to be a possible water bearing strata, is in the vicinity of VES-2 (target depths between 20 - 37m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 45m. The top few meters of the well should be grouted and sealed after drilling in order to avoid

contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 6b for UTM coordinates of the relevant VES points.

### **Mai Weini**

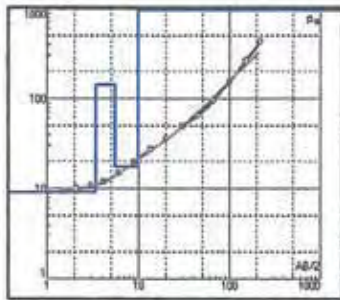
Results for Mai Weini site are also presented on Figure 6c. Prospect for groundwater at Mai Weini area generally seems bad. Drilling at Mai Weini is not recommended. Refer to either Table 3 or figure 6c for UTM coordinates of the relevant VES points.

### **Chea**

Results for Chea site are also presented on Figure 6c. Prospect for groundwater at Chea area generally seems bad. Drilling at Chea is not recommended. Refer to either Table 3 or figure 6c for UTM coordinates of the relevant VES points.

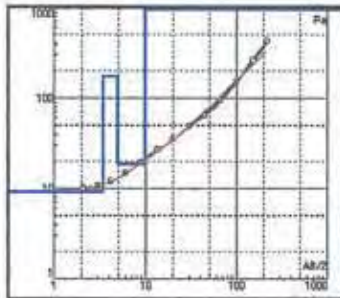
### **Filfil**

Results for Filfil site are also presented on Figure 6c. Prospect for groundwater at Filfil seems ok but may not be of sufficient yield. The relatively better location for drilling at Filfil, where there seems to be a possible water bearing strata, is in the vicinity of VES-2 (target depths between 19 - 37m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 45m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 6c for UTM coordinates of the relevant VES points.



Ves-1

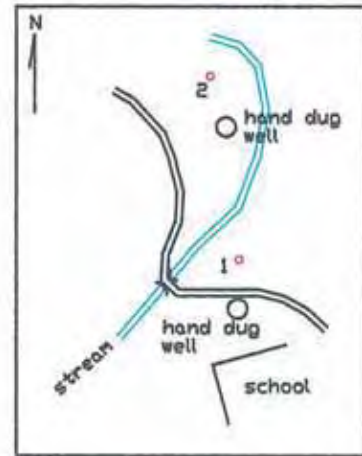
N	p	h	d	AB
1	9.4	3.42	3.42	2226
2	145	2.84	5.46	2224
3	17.9	4.38	9.84	2219
4	18818			



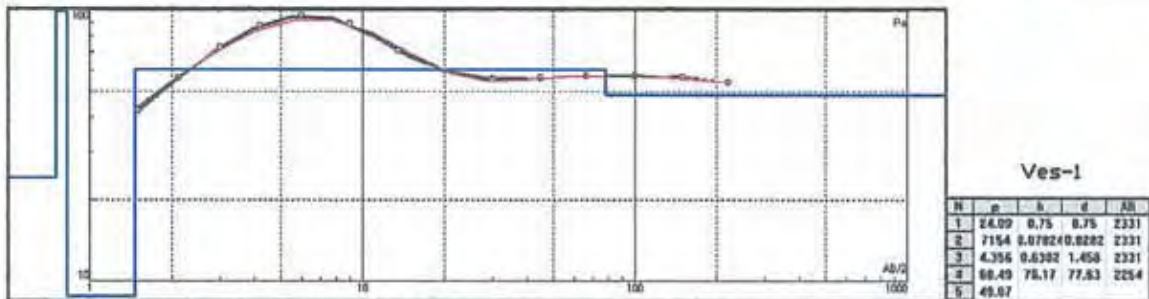
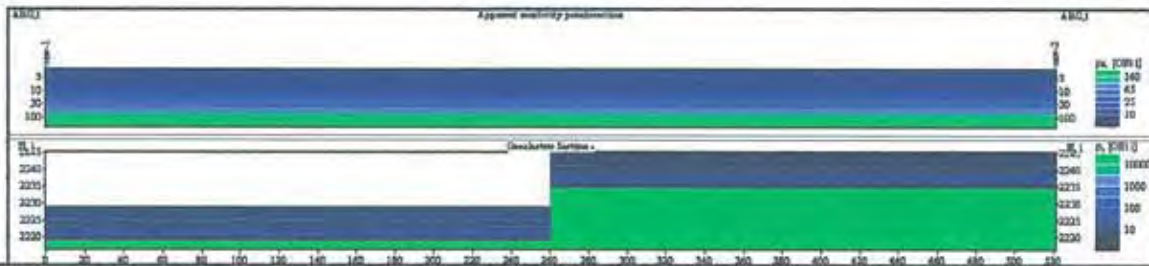
Ves-2

N	p	h	d	AB
1	9.41	3.38	3.38	2242
2	177	1.55	4.93	2240
3	19.2	4.92	9.85	2235
4	23618			

	UTM-N	UTM-E	Elevation
Sewhi 1	1480523	554938	2229
Sewhi 2	1481038	554857	2245

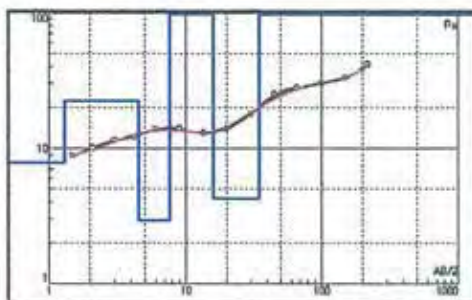


Sewhi  
VES point location



Ves-1

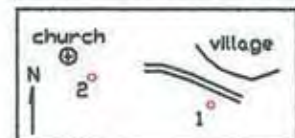
N	p	h	d	AB
1	24.09	0.75	0.75	2331
2	7154	0.0782	0.8282	2331
3	4.356	0.6382	1.458	2331
4	66.49	78.17	77.83	2254
5	49.87			



Ves-2

N	p	h	d	AB
1	7.94	1.3	1.3	2336
2	22.5	3.22	4.52	2331
3	2.86	3.83	7.55	2328
4	232	8.3	15.9	2320
5	4.29	18.6	34.5	2302
6	2638			

	UTM-N	UTM-E	Elevation
Mai keyh 1	1472642	557789	2332
Mai keyh 2	1472719	557453	2336



Mai Keyh  
VES point location

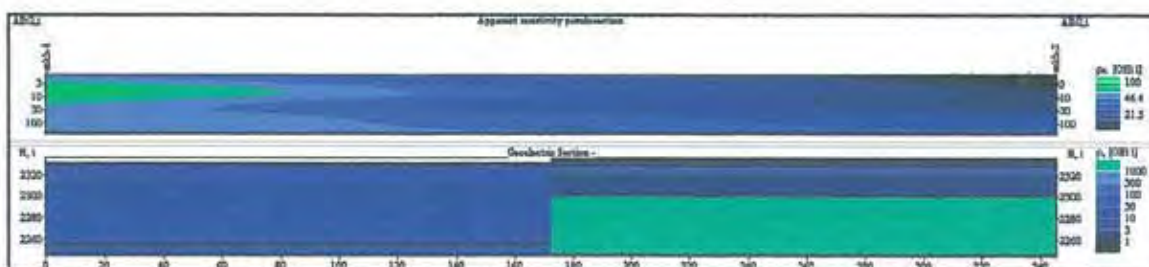
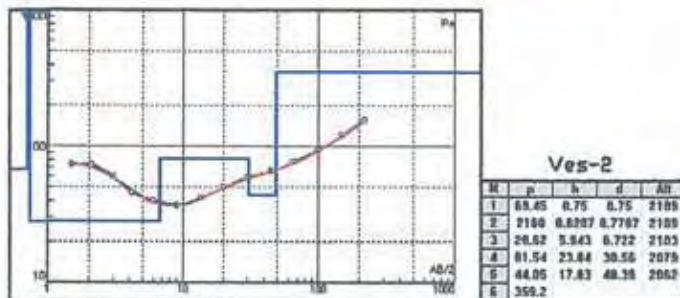
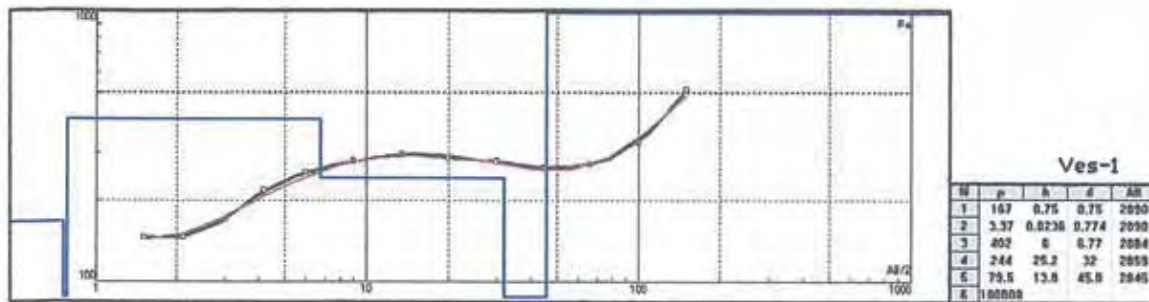
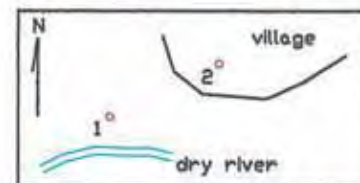


Figure 6a: Vertical Electrical Sounding results of Sewhi & Mai Keyh sites (Enderta wereda).

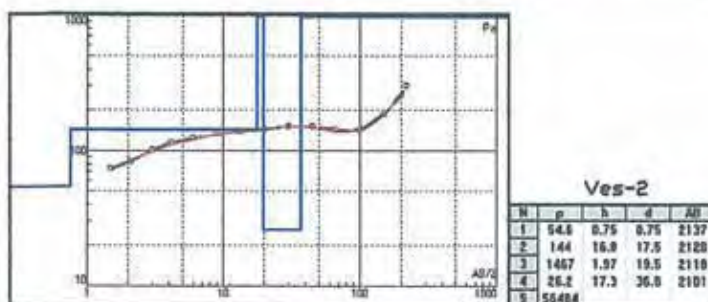
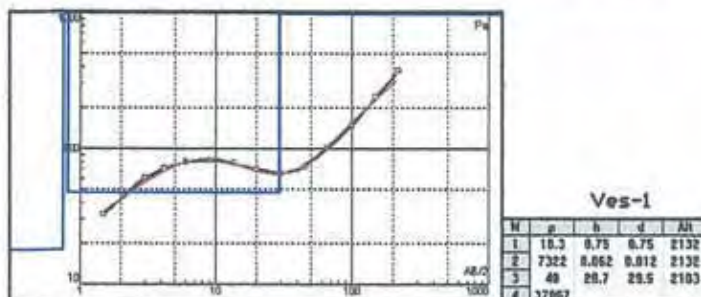
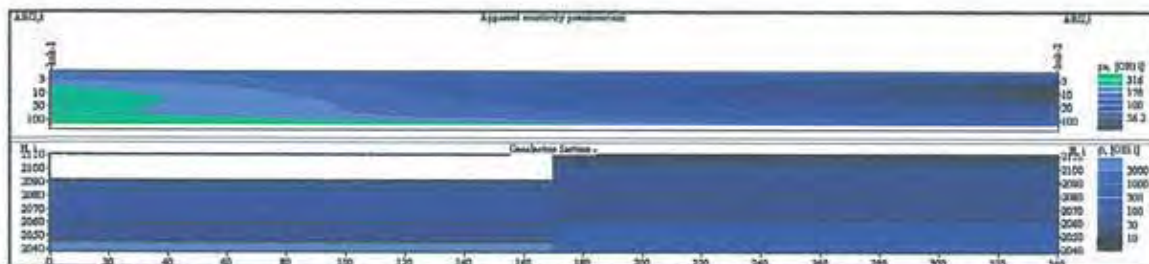




	UTM-N	UTM-E	Elevation
Kokahi 1	1487627	546457	2091
Kokahi 2	1487775	546763	2110



Kokahi  
VES point location



	UTM-N	UTM-E	Elevation
Adi Amik1	1489424	545046	2133
Adi Amik2	1489653	544781	2138



Adi Amik  
VES point location

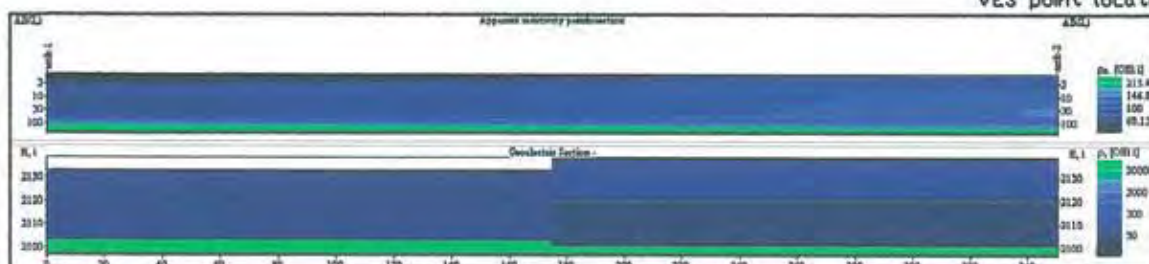


Figure 6b: Vertical Electrical Sounding results of Kokahi & Adlanik sites (Enderta wereda).

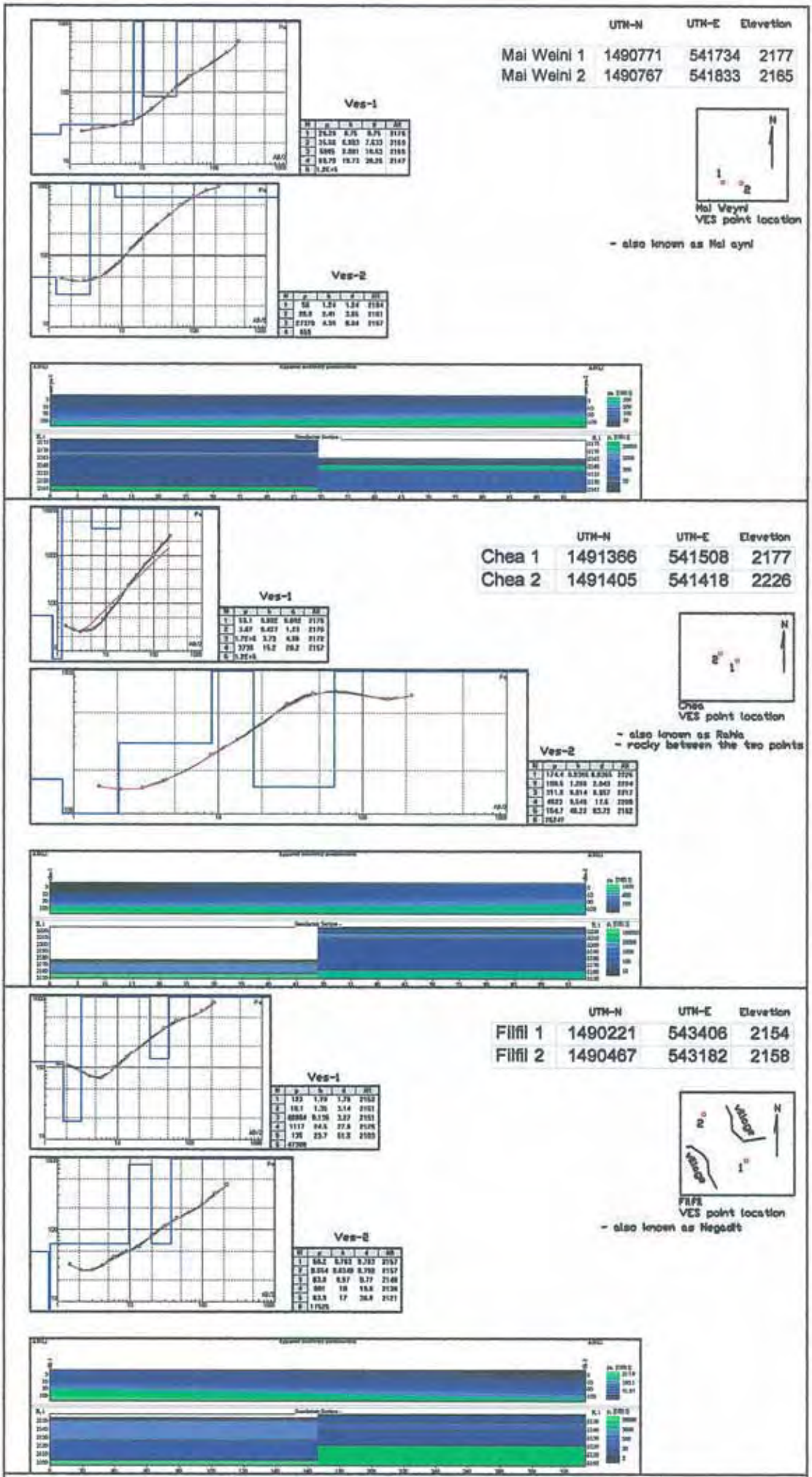


Figure 6a Vertical Electrical Sounding results of Mai Weini, Chea & Filfil sites (Ender to wereda).

## 8.6 KILTE AWLALO WEREDA

### *Around church (Sherafo)*

Results for Sherafo site are presented on Figure 7a. Prospect for groundwater at Sherafo area seems to be ok but may be of low yield. The relatively better location for drilling at Sherafo, where there seem to be multiple potential water bearing strata, is in the vicinity of VES-1 (target depths between 11 - 23m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 27m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 7a for UTM coordinates of the relevant VES points.

### *Adi Btsait*

Results for Adi Btsait site are also presented on Figure 7a. Prospect for groundwater at Adi Btsait area seems to be ok. The relatively better location for drilling at Adi Btsait, where there seem to be a potential water bearing strata, is in the vicinity of VES-2 (target depths between 20 - 54m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 60m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 7a for UTM coordinates of the relevant VES points.

### *Zebanadi (Ze'ana)*

Results for Ze'ana site are also presented on Figure 7a. Prospect for groundwater at Ze'ana area seems to be ok but may be of low yield. The relatively better location for drilling at Ze'ana, where there seem to be a possible water bearing strata, is in the vicinity of VES-1 (target depths between 22 - 104m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 110m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 7a for UTM coordinates of the relevant VES points.

### *Adi Woremai*

Results for Adi Weremai site are presented on Figure 7b. Prospect for groundwater at Adi Weremai area seems to be good. The relatively better location for drilling at Adi Weremai, where there seem to be a possible water bearing strata, is in the vicinity of VES-2 (target depths between 13 - 38m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 45m. The top few meters of the well should be grouted and sealed after drilling in order to avoid

contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 7b for UTM coordinates of the relevant VES points.

### **Adi Arbea**

Results for Adi Arbea site are also presented on Figure 7b. Prospect for groundwater at Adi Arbea area seems to be ok. The relatively better location for drilling at Adi Arbea, where there seem to be a possible water bearing strata, is in the vicinity of VES-2 (target depths between 25 - 61m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 65m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 7b for UTM coordinates of the relevant VES points.

### **Adi Diano**

Results for Adi Diano site are presented on Figure 7c. Prospect for groundwater at Adi Diano area seems to be ok. The location for drilling at Adi Diano is at the VES point (target depths between 50 - 80m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 85m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 7c for UTM coordinates of the relevant VES points

### **Adi Kulala**

Results for Adi Kulala site are presented on Figure 7d. Prospect for groundwater at Adi Kulala area seems to be ok. The location for drilling at Adi Kulala is at the VES point (target depths between 25 - 82m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 85m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 7d for UTM coordinates of the relevant VES points

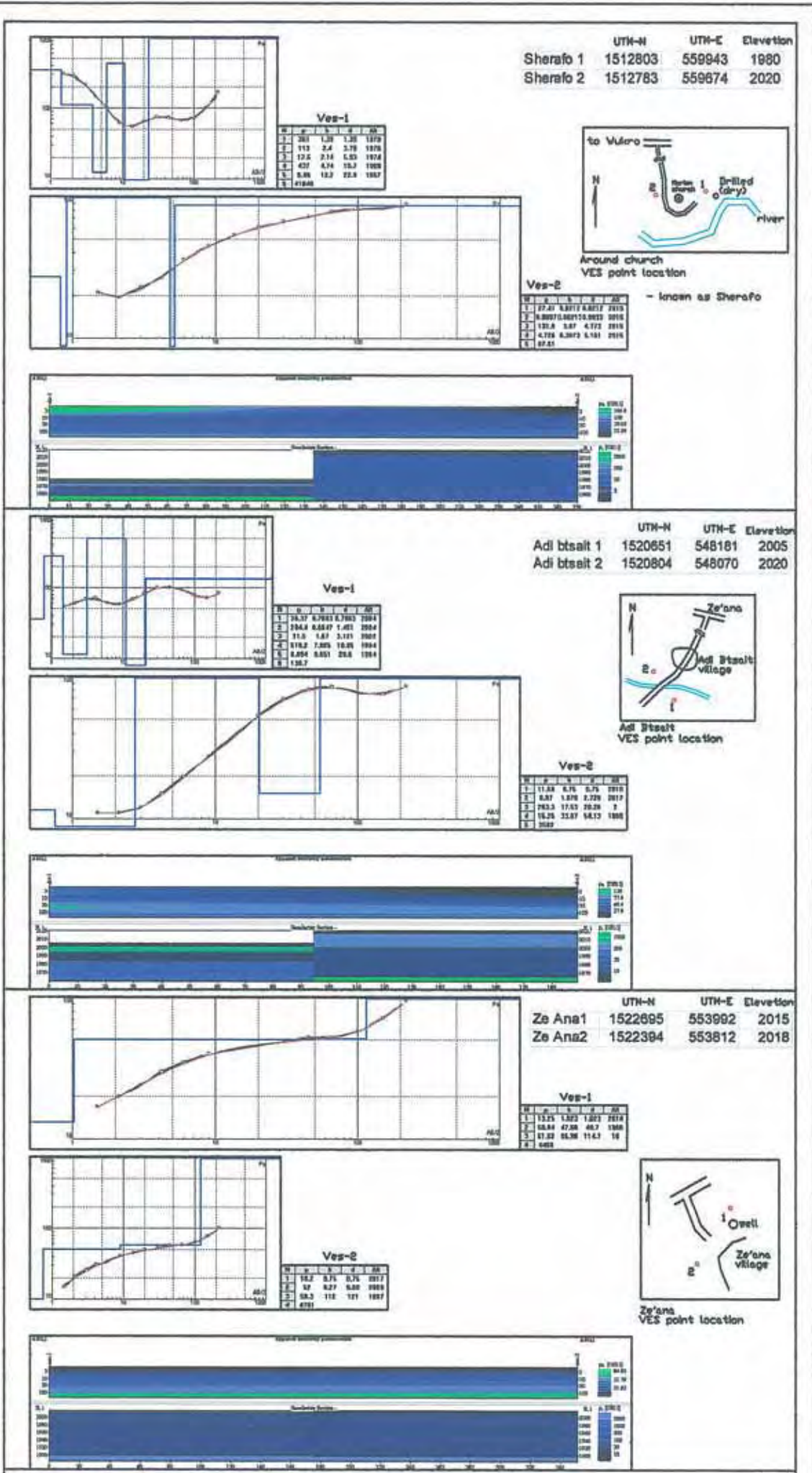
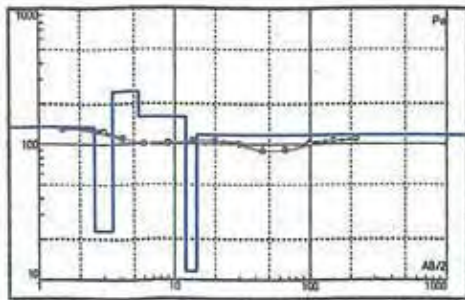


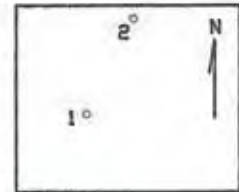
Figure 7a: Vertical Electrical Sounding results of Sherafa, Adi Btsait and Ze'ana sites (Kite Awlala wereda).

	UTM-N	UTM-E	Elevation
Adi Weraim 1	1520469	558621	2020
Adi Weraim 2	1520736	558754	2018

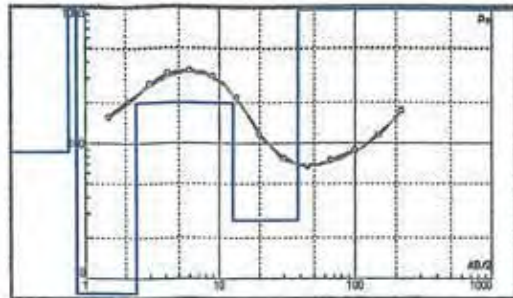


Ves-1

N	p	h	d	Ah
1	125.5	2.558	2.558	2017
2	23.43	0.808	3.482	2017
3	247.8	1.021	5.383	2015
4	168.1	6.642	12.02	2008
5	11.83	2.452	14.40	2008
6	117.7			

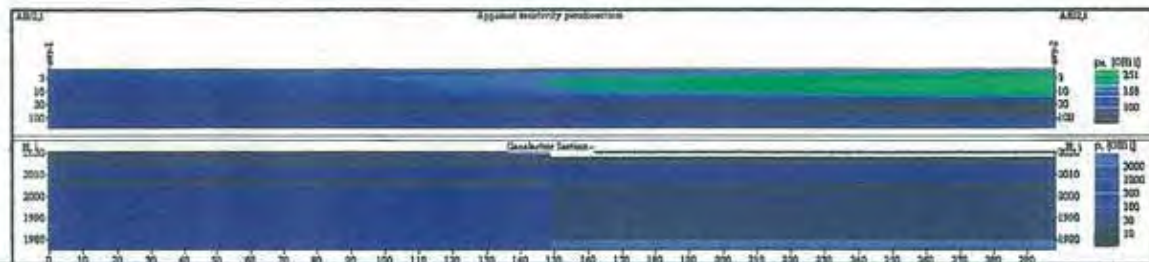


Adi Weraim  
VES point location

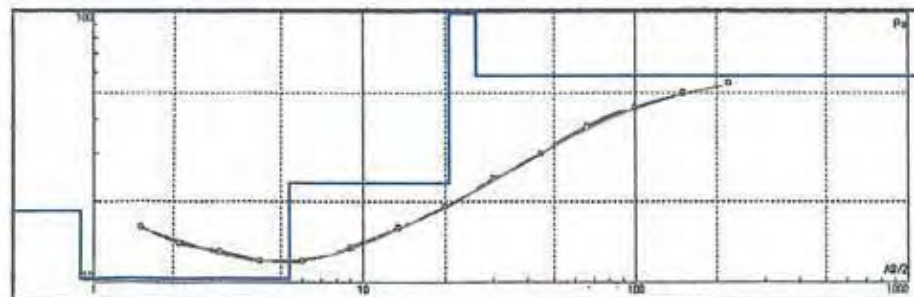


Ves-2

N	p	h	d	Ah
1	87.4	0.76	0.76	2017
2	21816	0.185	0.853	2017
3	5.74	1.5	2.30	2016
4	188	10.2	12.6	2005
5	27.1	25.5	38.1	1889
6	15848			

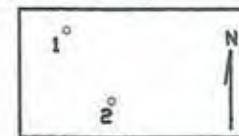


	UTM-N	UTM-E	Elevation
adi arbaa 1	1524883	562860	1985
adi arbaa 2	1524684	562987	1964

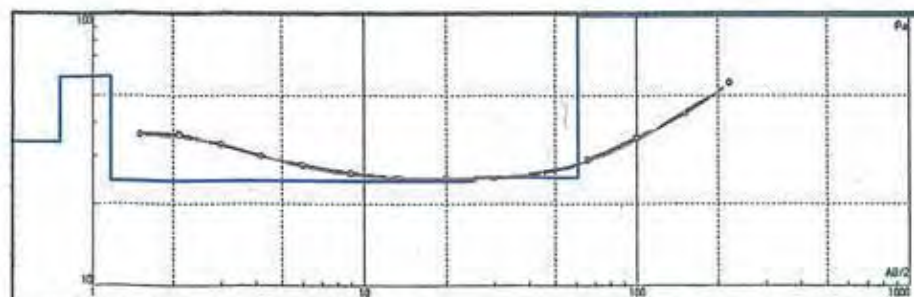


Ves-1

N	p	h	d	Ah
1	18.47	0.8083	0.8083	1984
2	10.37	4.488	5.277	198
3	23.41	15.26	20.54	1964
4	212	5.17	25.01	1953
5	58.53			



Adi Arbaa  
VES point location



Ves-2

N	p	h	d	Ah
1	34.05	0.75	0.75	1983
2	58.14	8.4133	1.163	1983
3	24.47	24.21	25.37	1959
4	25.35	35.54	60.51	1923
5	110.9			

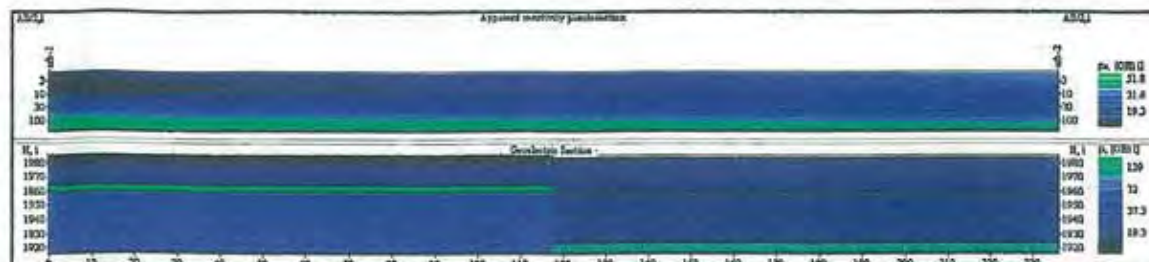


Figure 7b) Vertical Electrical Sounding results of Adi Weraim & Adi Arbaa sites (Kite Awlalo wereda).

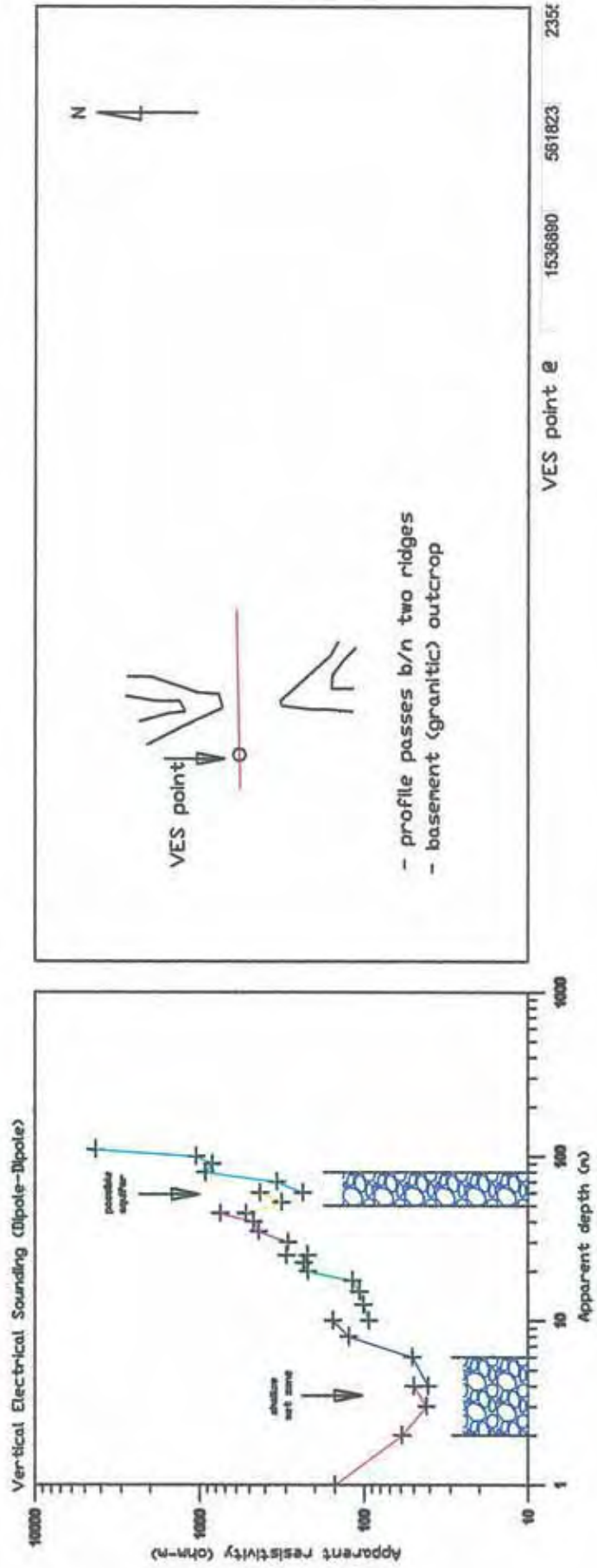
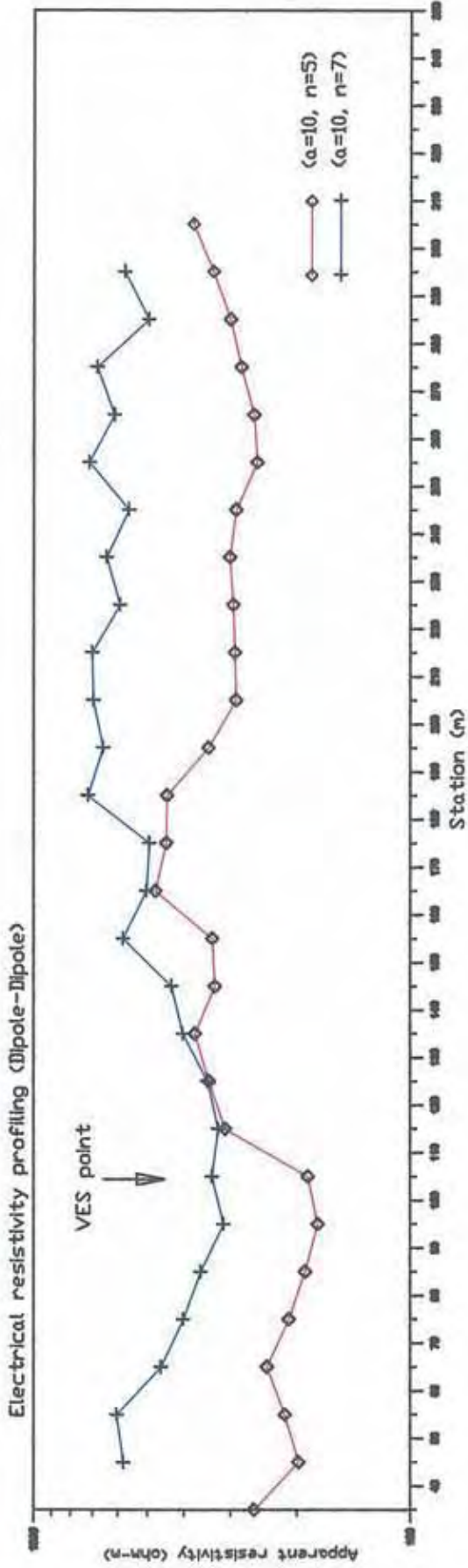


Figure 7c: Dipole-Dipole resistivity profiling and VES survey results of Adi Daino site (Kilte Awlalo woreda).

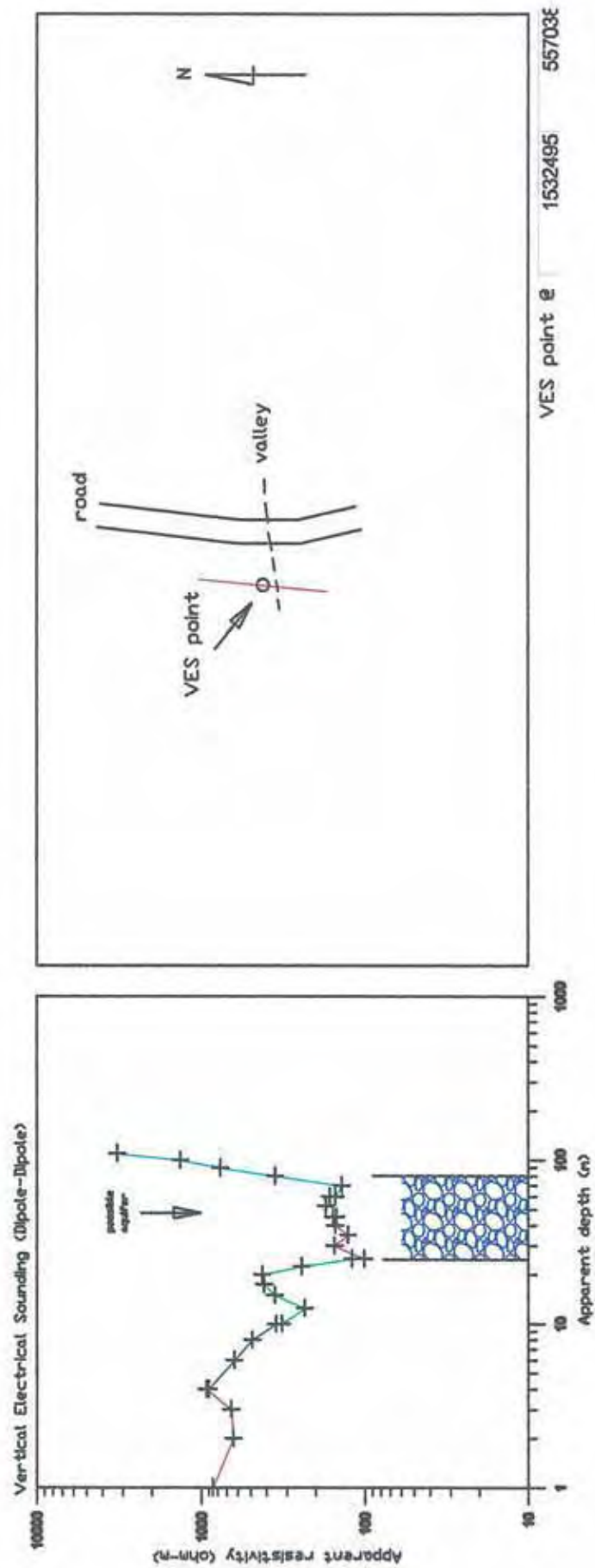
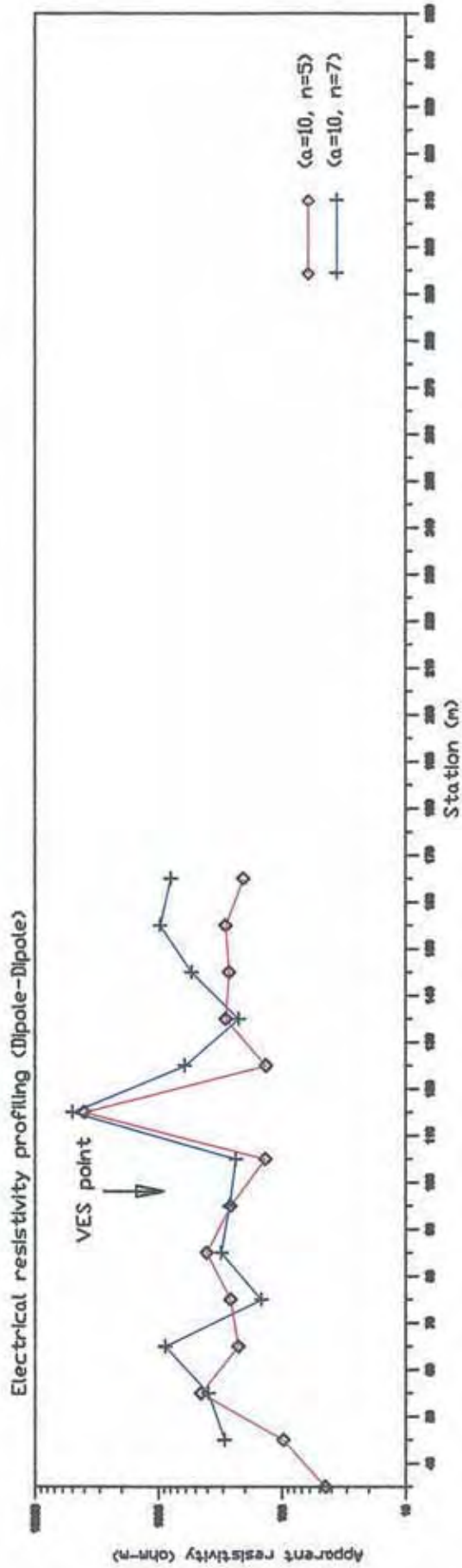


Figure 7d: Dipole-Dipole resistivity profiling and VES survey results of Adi Kulala site (Kilte Awlalo wereda).



## 8.7 HAWZEN WEREDA

### Berakit-1

Results for Berakit(1) site are presented on Figure 8a. Prospect for groundwater at Berakit(1) area seems to be good. The relatively better location for drilling at Berakit(1), where there seem to be a potential water bearing strata, is in the vicinity of VES-2 (target depths between 18 - 35m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 40m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 8a for UTM coordinates of the relevant VES points.

### Degamba (Mai Chea)

Results for Degamba site are also presented on Figure 8a. Prospect for groundwater at Degamba area seems to be good. The relatively better location for drilling at Degamba, where there seem to be a potential water bearing strata, is in the vicinity of VES-1 (target depths between 28 - 37m), and is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 45m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 8a for UTM coordinates of the relevant VES points.

### Merer Hwa

Results for Merer Hwa site are presented on Figure 8b. Prospect for groundwater at Merer Hwa area seems to be fair. The location for drilling at Merer Hwa is at the VES point (target depths between 30 - 90m) where multiple aquifers are envisaged. The Merer Hwa site is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 95m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 8b for UTM coordinates of the relevant VES points.

### Mewkel

Results for Mewkel site are presented on Figure 8c. Prospect for groundwater at Mewkel area seems to be good. The location for drilling at Mewkel is at the VES point (target depths between 15 - 80m) where multiple aquifers are envisaged. The Mewkel site is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 85m. The top few meters of the well should be grouted and sealed after drilling in

order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 8c for UTM coordinates of the relevant VES points.

### **Berakit-2**

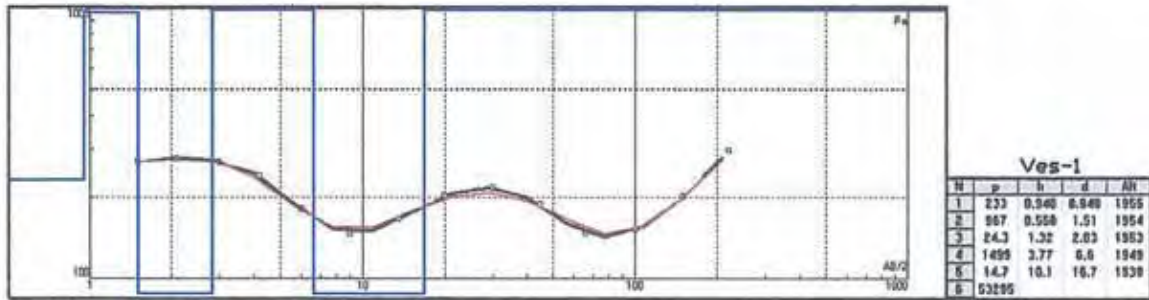
Results for Berakit(2) site are presented on Figure 8d. Prospect for groundwater at Berakit(2) area seems to be quite good. The location for drilling at Berakit(2) is at the VES point (target depths between 18 - 70m) where multiple aquifers are envisaged. The Berakit(2) site is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 75m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 8d for UTM coordinates of the relevant VES points.

### **Teka**

Results for Teka site are presented on Figure 8e. Prospect for groundwater at Teka area seems to be ok. The location for drilling at Teka is at the VES point (target depths between 2 - 80m) where multiple aquifers are envisaged. The Teka site is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 85m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 8e for UTM coordinates of the relevant VES points.

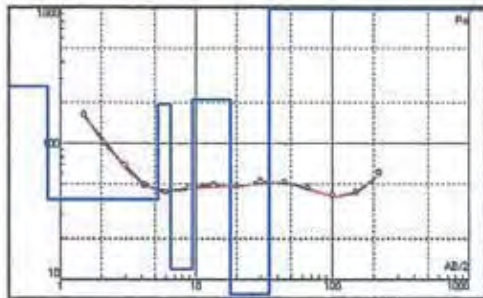
### **Tsefah (Adi Kelese)**

Results for Tsefah (locally known as Adi Kelese) site are presented on Figure 8f. Prospect for groundwater at Tsefah area seems to be ok. The location for drilling at Tsefah is at the VES point (target depths between 60 – 110<sup>+</sup>m). At Tsefah, the lower limit of the envisaged possible aquifer has not been reached. The Tsefah site is recommended for borehole construction. The target depth should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 120m (or more as required during drilling). The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 8f for UTM coordinates of the relevant VES points.

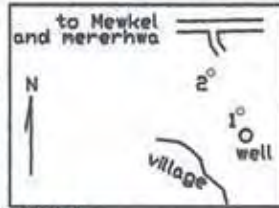


M	p	h	d	Alt
1	233	0.940	0.940	1955
2	867	0.568	1.51	1954
3	24.3	1.32	2.03	1953
4	1499	3.77	6.6	1949
5	14.7	10.1	16.7	1938
6	63295			

	UTM-N	UTM-E	Elevation
Berakit 1	1539973	535062	1956
Berakit 2	1540082	534979	1954

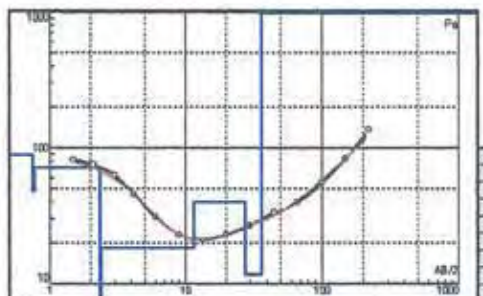
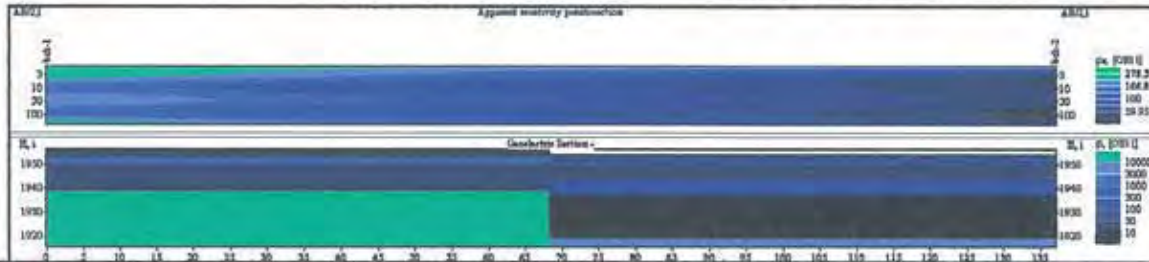


M	p	h	d	Alt
1	288	0.805	0.805	1953
2	33	4.48	5.28	1949
3	195	1.28	0.52	1947
4	12	2.9	0.42	1945
5	211	0.63	19.1	1938
6	5.14	18.5	34.8	1919
7	6688			



- well ~32m
- failed hand pump
- 11 years old

Berakit  
VES point location  
- locally called Guehe

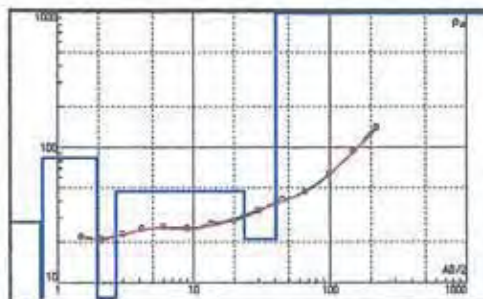


M	p	h	d	Alt
1	88.4	0.75	0.75	2353
2	48.8	0.0236	0.774	2352
3	72.5	1.55	2.32	2352
4	0.722	0.054	2.38	2352
5	18.6	9.1	11.5	2343
6	48.7	18	27.5	2327
7	31.8	9.1	38.8	2317
8	22819			

	UTM-N	UTM-E	Elevation
Degamba 1	1558866	549883	2354
Degamba 2	1558721	549906	2353



Degamba  
VES point location  
- locally known as Mal Chea



M	p	h	d	Alt
1	28.41	0.75	0.75	2352
2	0.3999	0.02358	0.7736	2352
3	84.92	1.167	1.931	2351
4	2.881	0.7359	2.665	235
5	47.81	21.1	23.77	2329
6	21.23	16.58	40.35	2313
7	12019			

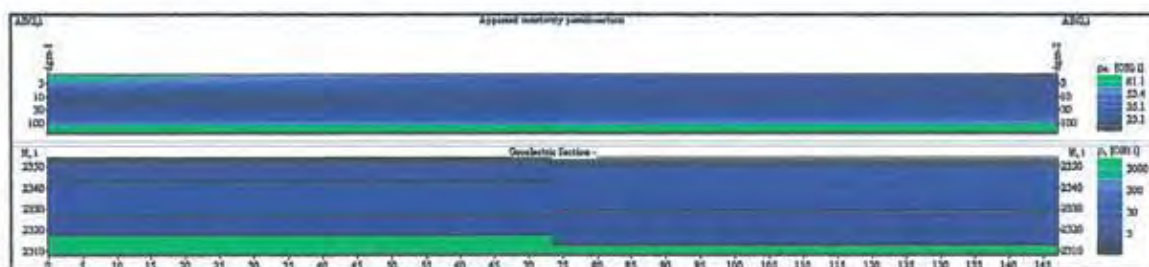


Figure 8a: Vertical Electrical Sounding results of Berakit & Degamba sites (Hawzen weredo).

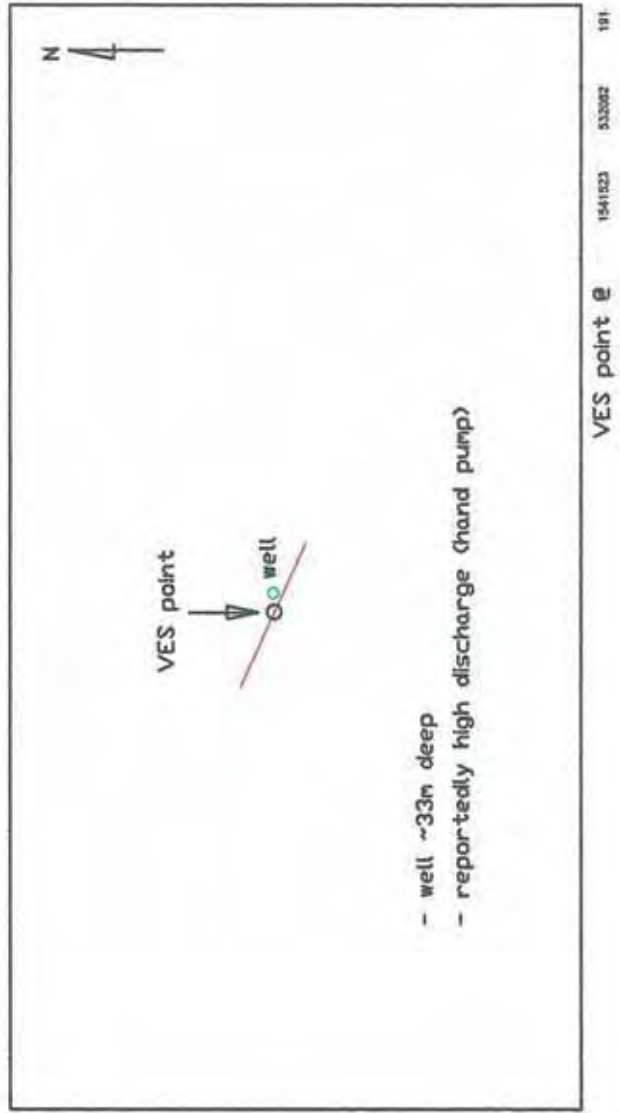
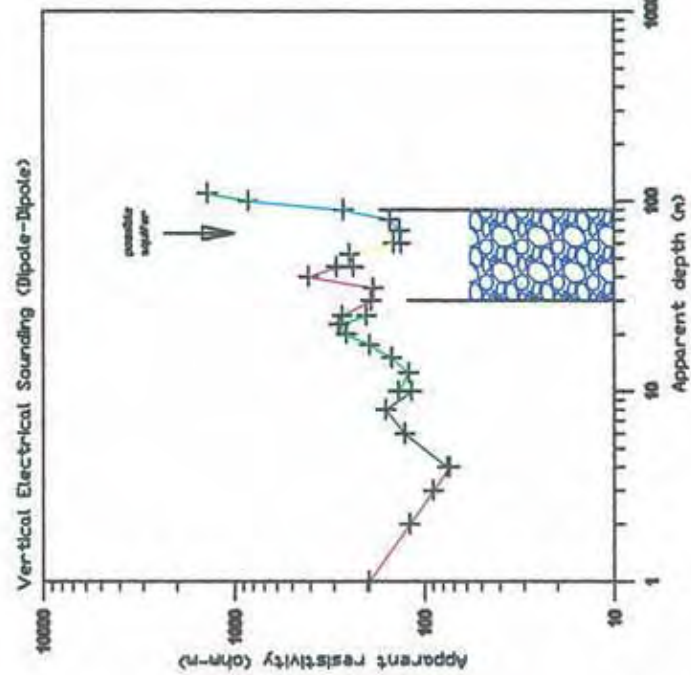
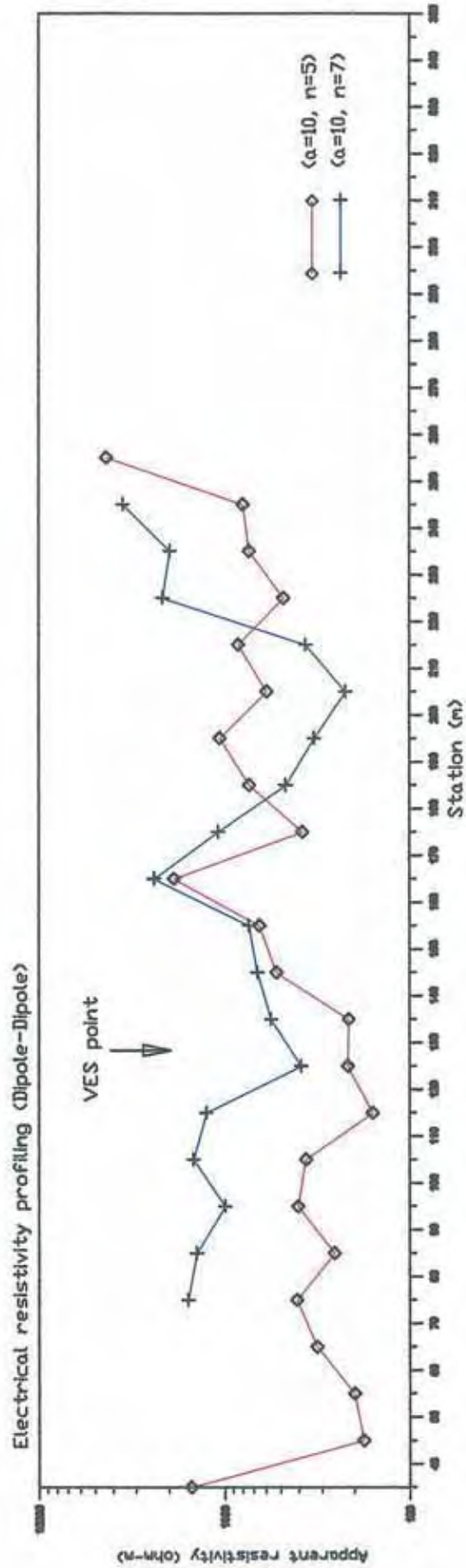


Figure 8b: Dipole-Dipole resistivity profiling and VES survey results of Merer Wuha site (Hawzen wereda).

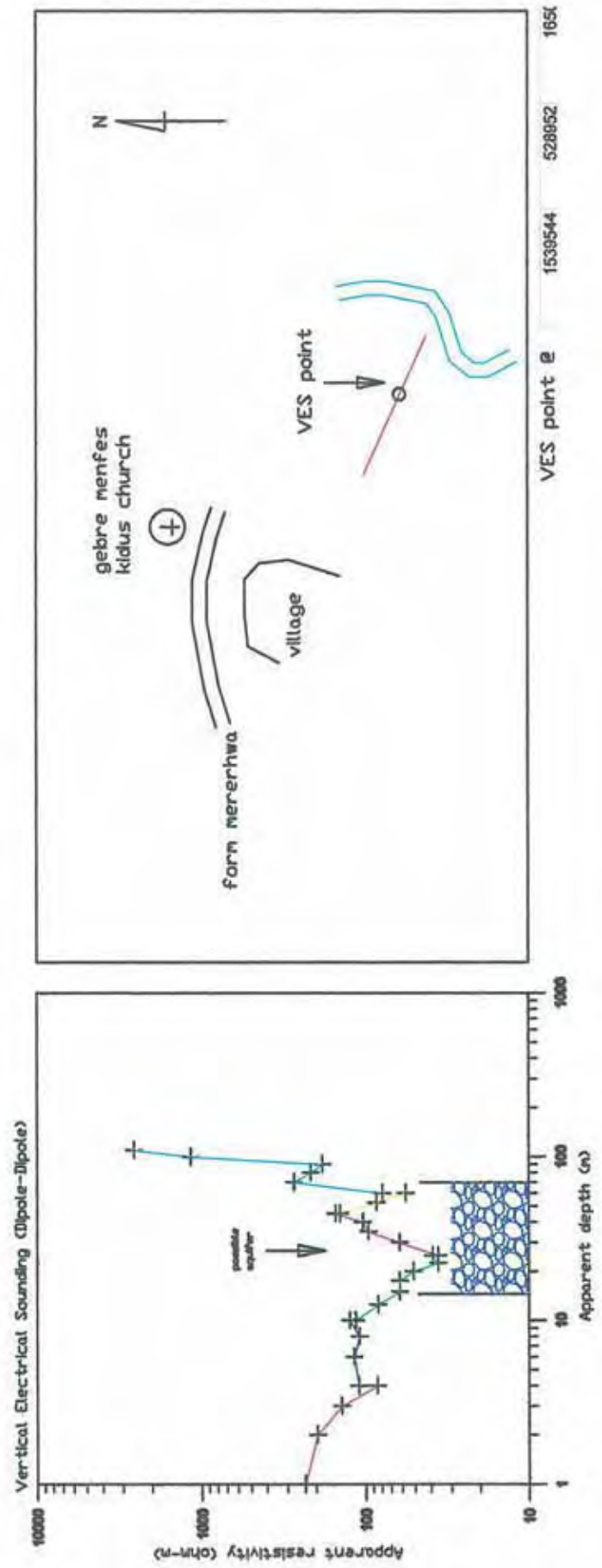
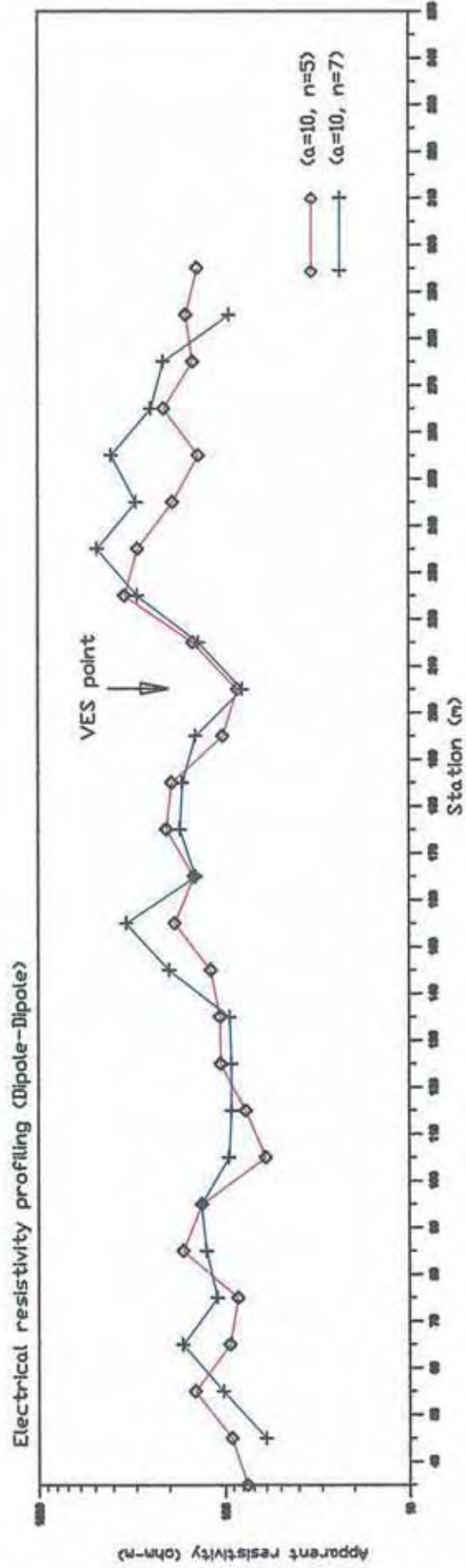


Figure 8c: Dipole-Dipole resistivity profiling and VES survey results of Mewkel site (Hawzen weredo).

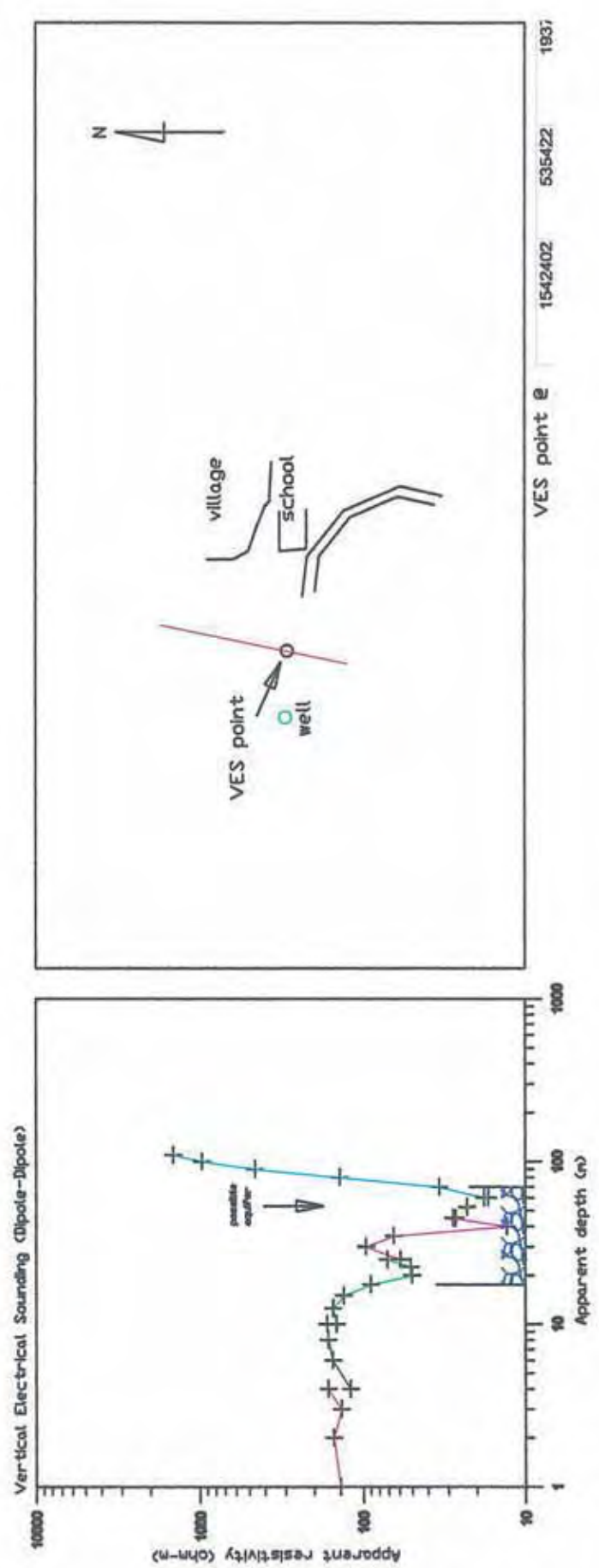
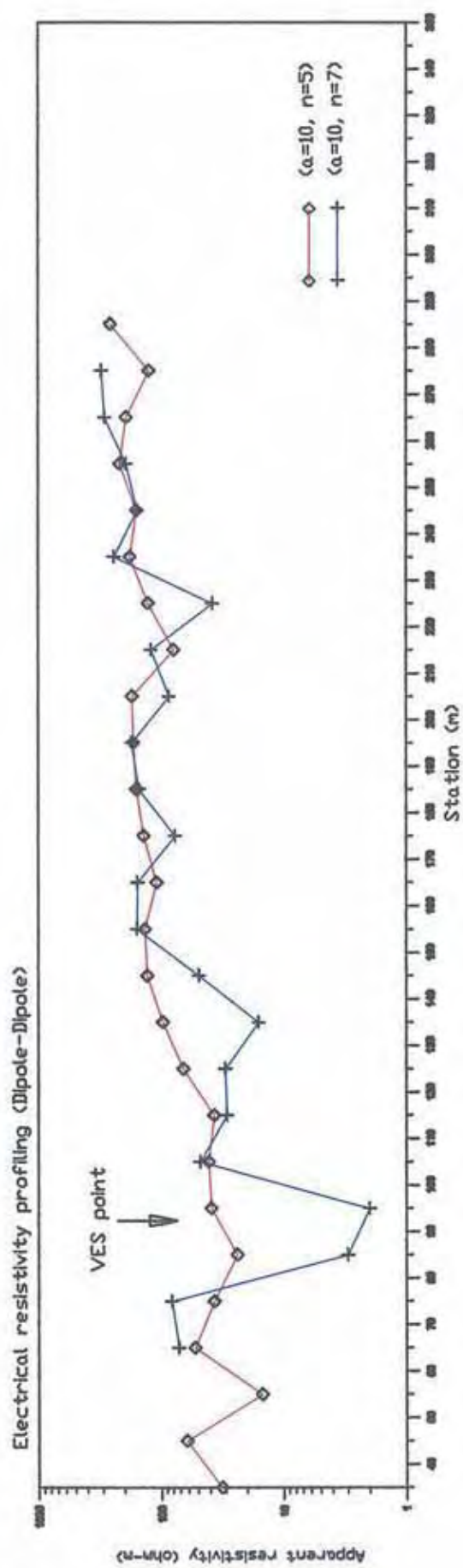


Figure 8d: Dipole-Dipole resistivity profiling and VES survey results of Berakit site (Howzen wereda).

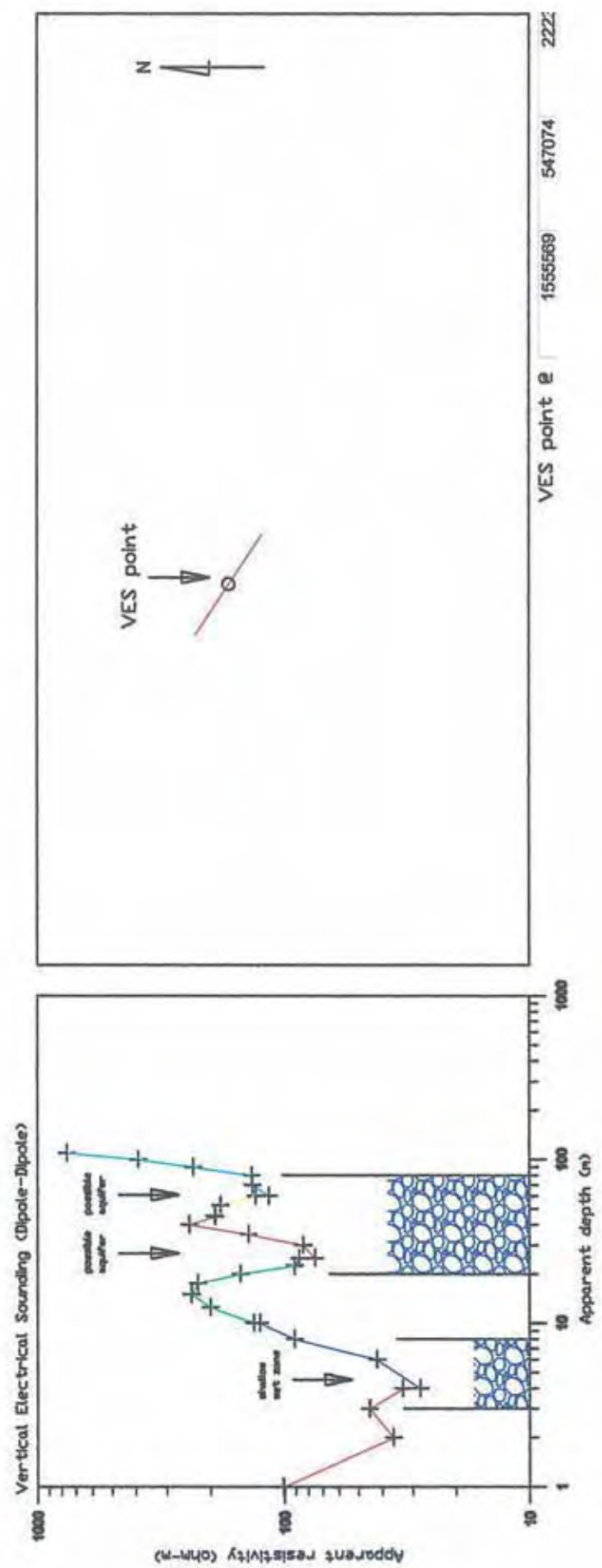
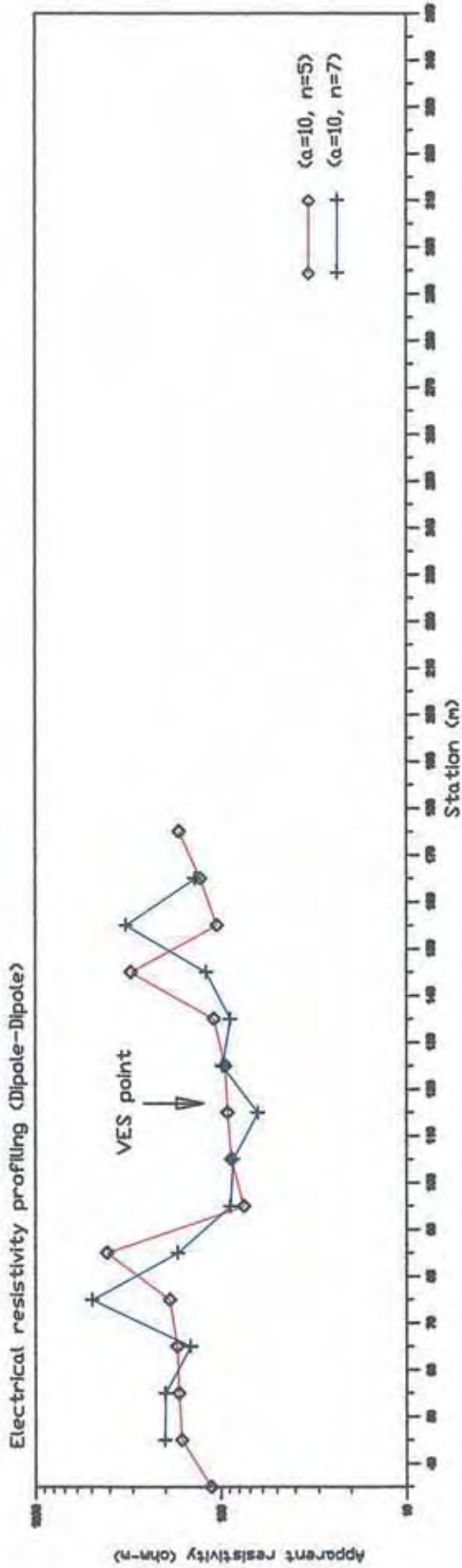


Figure 8e: Dipole-Dipole resistivity profiling and VES survey results of Teko site (Hawzen weredo).

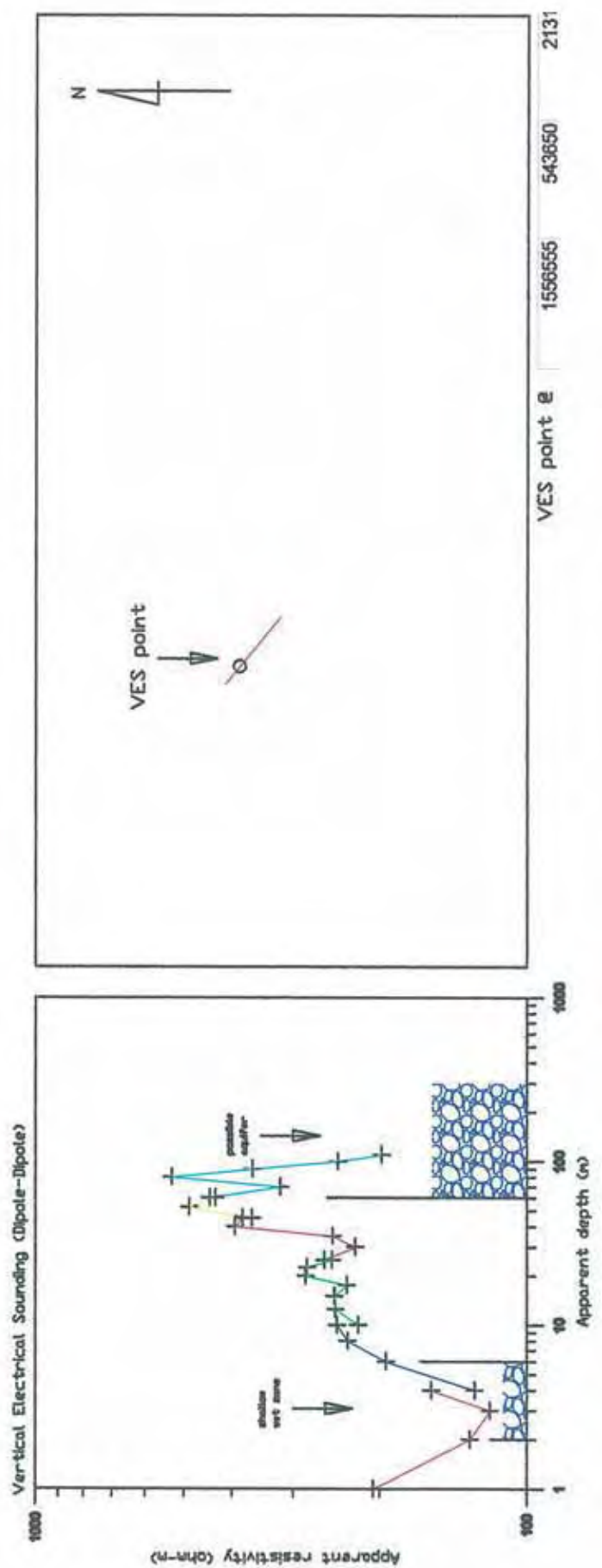
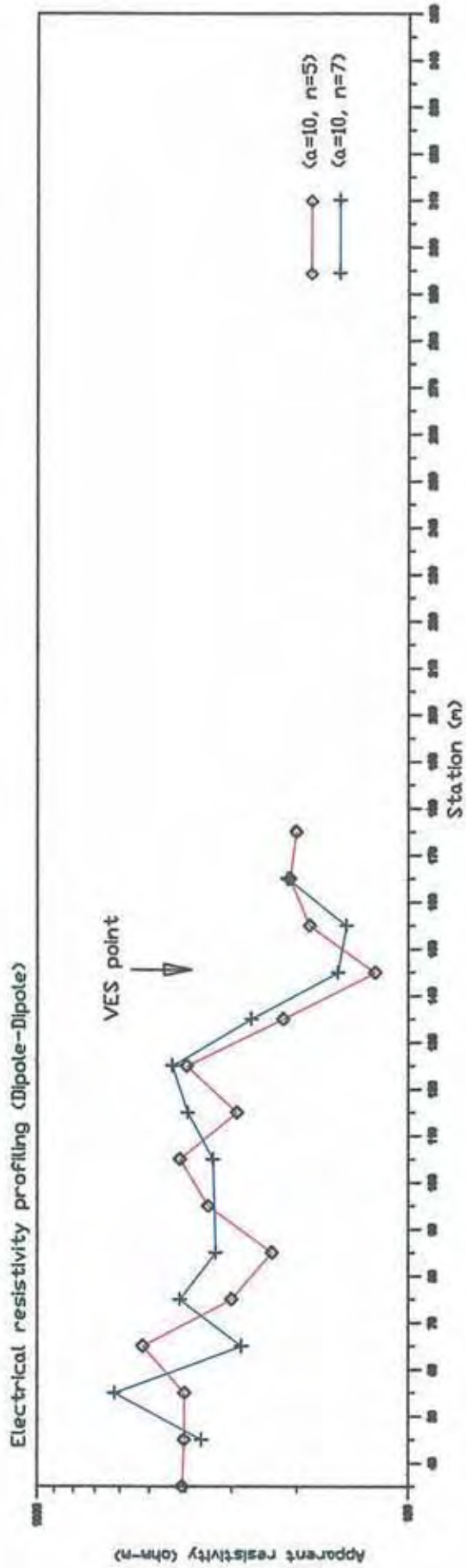


Figure 8f: Dipole-Dipole resistivity profiling and VES survey results of Tsefah/Adl Kelese site (Hawzen weredo).



## 8.8 DEGA TEMBIEN WEREDA

### Raset

Results for the Raset site are presented on Figure 9a. Prospect for groundwater at Raset area seems to be good. The relatively better location for drilling at Raset, where there seem to be a distinct possible water bearing strata, is in the vicinity of VES-1 (target depths between 29 - 51m). The Raset site is recommended for borehole construction. The indicated target depth should be intersected as much as possible during drilling. Total depth of drilling for Raset is recommended to be at least 55m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 9a for UTM coordinates of the relevant VES points.

### Enda Mariam

Results for Enda Mariam site are also presented on Figure 9a. Prospect for deep groundwater at Enda Mariam area generally seems not so good. Drilling at Enda Mariam is not recommended. However, constructing a small yield hand dug well may however be possible there. The relatively better location for a hand dug well, where there seems to be a possible water bearing strata, is in the vicinity of VES-2 (target depths between 11 - 22m), and is recommended for borehole construction. The target depth should be intersected as much as possible during digging. Total depth of digging is recommended to be 22m if possible. Refer to either Table 3 or figure 9a for UTM coordinates of the relevant VES points.

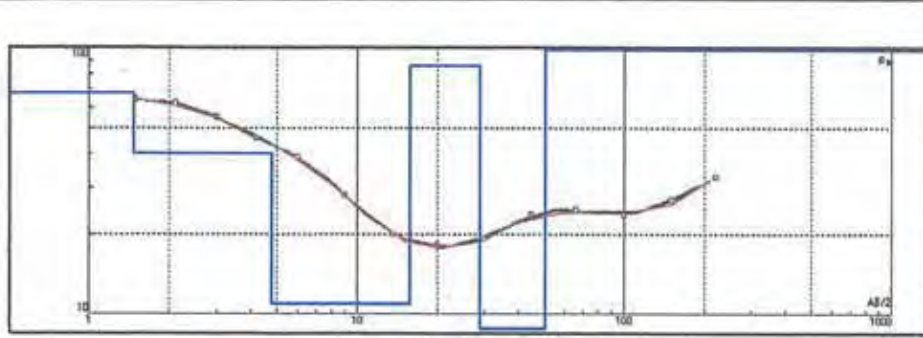
### Alasa

Results for Alasa site are presented on Figure 9b. Prospect for deep groundwater at Alasa area generally seems not so good. However, a possibly good shallow aquifer seems to be present at Alasa. Drilling at Alasa is not recommended. Constructing a hand dug well is however recommended there. The relatively better location for a hand dug well, where there seems to be a distinct possible water bearing strata, is in the vicinity of VES-2 (target depths between 3 - 20m), and is recommended for the well construction. The target depth should be intersected as much as possible during digging. Total depth of digging is recommended to be 20m if possible. Refer to either Table 3 or figure 9b for UTM coordinates of the relevant VES points.

### Dinglet

Results for the Dinglet site are also presented on Figure 9b. Prospect for groundwater at Dinglet area seems to be good. The relatively better location for drilling at Dinglet, where there seem to be multiple but distinct possible water bearing strata, is in the vicinity of VES-1 (target depths between 19 - 52m). The Dinglet site is recommended for borehole construction. The indicated target depth should be intersected as much as possible during drilling. Total depth of drilling for Dinglet is recommended to be at least 60m. The top few meters of the well should be grouted and sealed after drilling

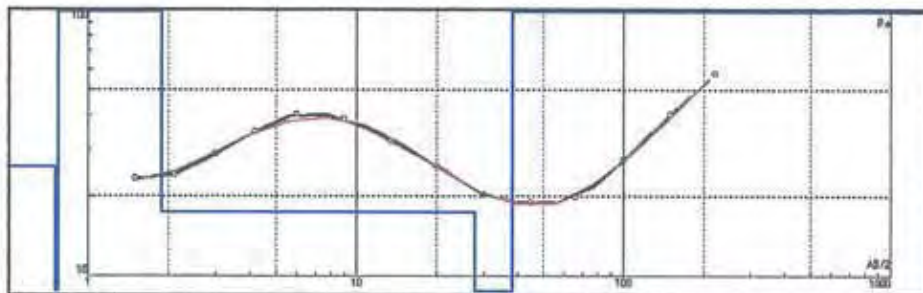
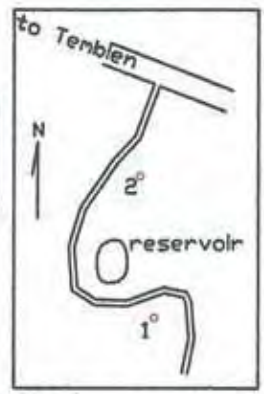
in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 9b for UTM coordinates of the relevant VES points.



	UTH-N	UTH-E	Elevation
Raset 1	1511034	527979	2421
Raset 2	1511440	527938	2454

**Ves-1**

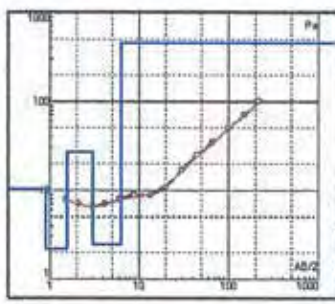
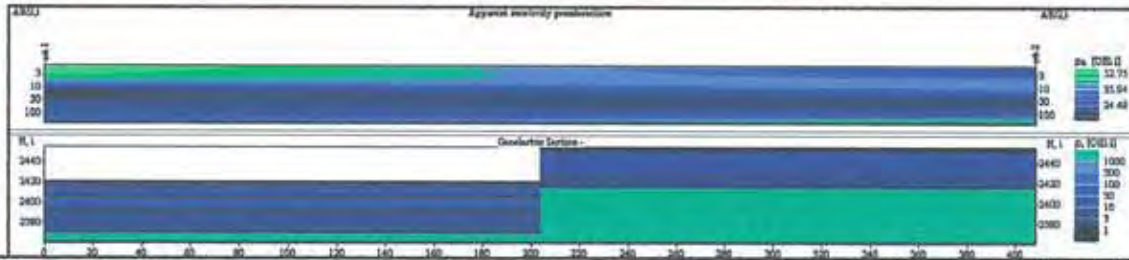
H	p	h	d	Ah
1	58.12	1.495	1.465	242
2	48.37	3.321	4.795	2416
3	18.97	10.91	15.7	2486
4	86.21	13.12	28.82	2392
5	4.884	21.63	58.45	2371
6	3476			



**Ves-2**

H	p	h	d	Ah
1	25.91	0.75	0.75	2453
2	8.453	3.027710	7.727	2453
3	323.5	0.441	1.214	2453
4	117.7	0.6884	1.874	2452
5	17.49	26.86	27.72	2426
6	4.832	18.54	38.26	2416
7	8841			

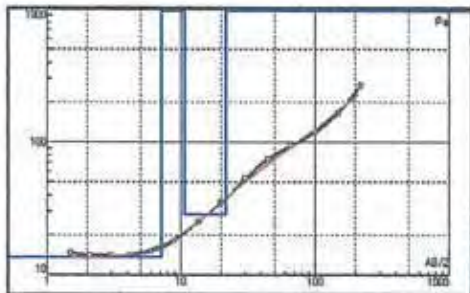
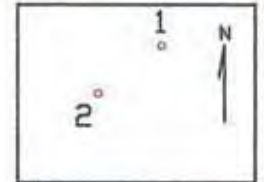
Raset VES point location



	UTH-N	UTH-E	Elevation
Enda Mariam 1	1501301	512831	2622
Enda Mariam 2	1501164	512649	2629

**Ves-1**

H	p	h	d	Ah
1	18.5	0.888	0.888	2621
2	2.25	0.648	1.55	2629
3	27.4	1.48	3.91	2619
4	2.48	3.35	6.38	2616
5	468			



**Ves-2**

H	p	h	d	Ah
1	13.7	7.13	7.13	2922
2	1878	3.83	10.7	2619
3	28.9	18.0	21.8	2807
4	18705			

Enda Mariam VES point location - locally known as Korar

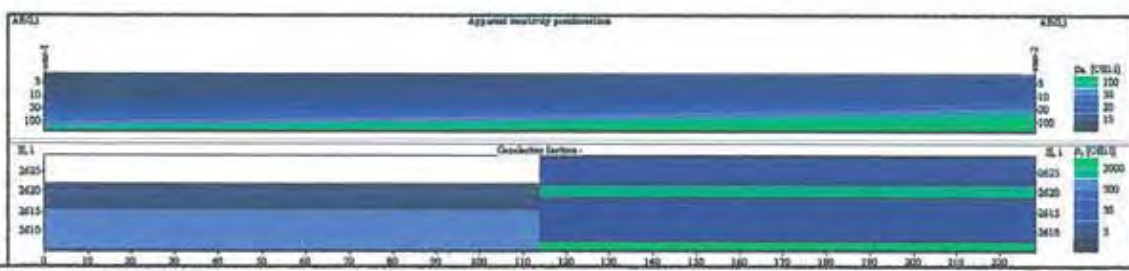
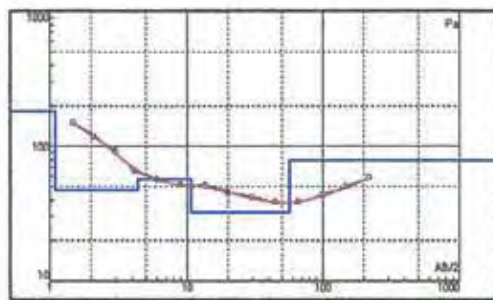


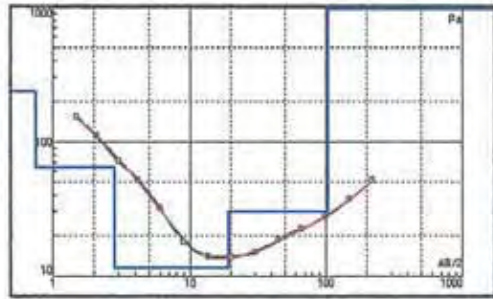
Figure 9a: Vertical Electrical Sounding results of Raset & Enda Mariam sites (Deqa Tembien wereda).



**Ves-1**

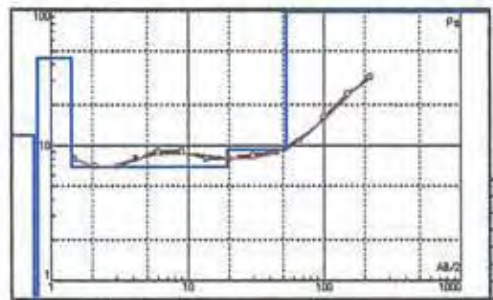
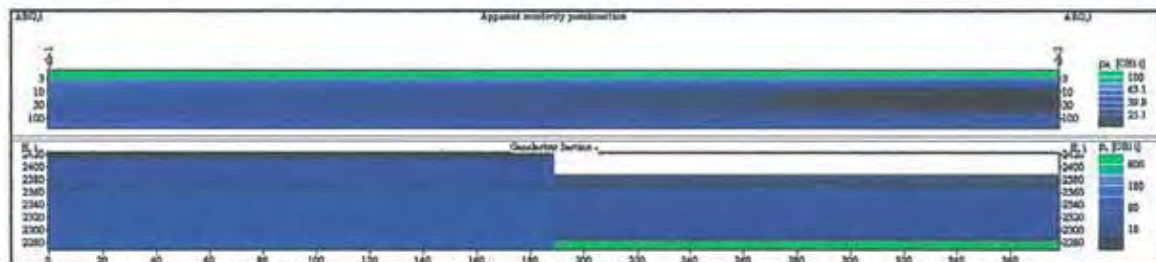
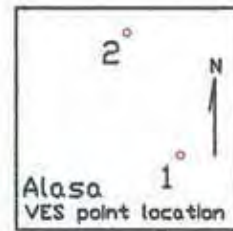
N	p	h	d	AB
1	184.8	1.05	1.59	242
2	47.93	3.257	4.357	2417
3	57.57	5.322	10.68	241
4	32.89	46.84	56.72	2354
5	78.18			

	UTM-N	UTM-E	Elevation
Alasa 1	1512574	528894	2421
Alasa 2	1512921	528744	2387



**Ves-2**

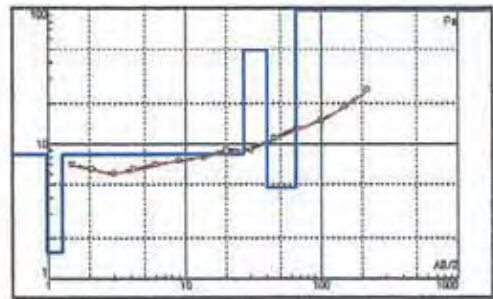
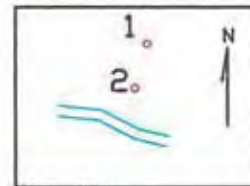
N	p	h	d	AB
1	238.6	0.75	0.75	2388
2	64.85	2.058	2.058	2384
3	11.62	16.32	18.13	2368
4	38.51	83.84	103	2284
5	2238			



**Ves-1**

N	p	h	d	AB
1	12	0.75	0.75	2585
2	0.168	0.8411	0.791	2585
3	45.3	0.808	1.4	2585
4	7.03	17.8	19.3	2587
5	0.39	33	52.3	2534
6	1854			

	UTM-N	UTM-E	Elevation
Denglet 1	1506499	518863	2586
Denglet 2	1506374	518829	2579



**Ves-2**

N	p	h	d	AB
1	6.389	0.9747	0.9747	2578
2	1.582	0.2842	1.250	2578
3	6.483	25.47	26.73	2562
4	49.77	13.27	40	2529
5	4.771	24.87	64.87	2514
6	1185			

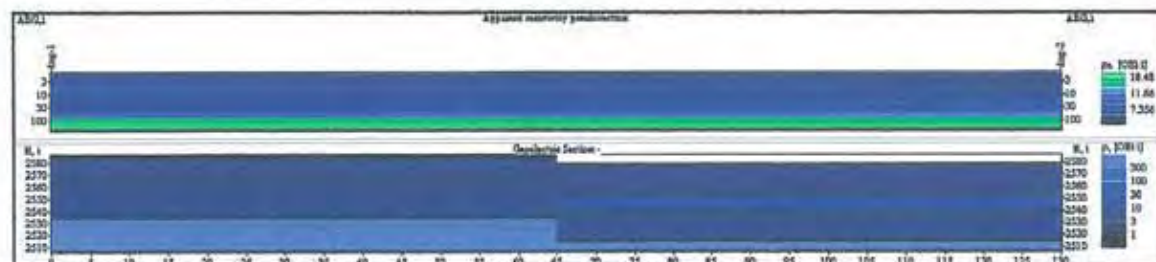


Figure 9b) Vertical Electrical Sounding results of Alasa & Denglet sites (Diega Tenbien wereda).

## 8.9 KOLA TEMBIEN WEREDA

### Deda

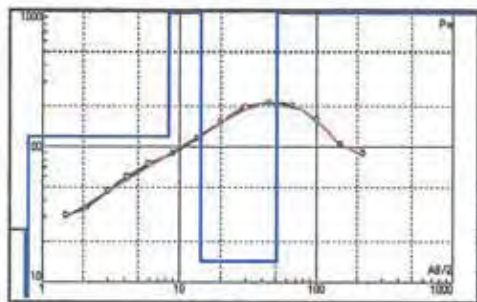
Results for the Deda site are presented on Figure 10a. Prospect for groundwater at Deda area generally seems to be very good. The relatively better location for drilling at Deda, where there seem to be a distinct potentially water bearing strata, is in the vicinity of VES-2 (target depths between 65 - 80m). The Deda site is recommended for borehole construction. The indicated target depth at Deda should be intersected as much as possible during drilling. Total depth of drilling at Deda is recommended to be at least 85m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 10a for UTM coordinates of the relevant VES points.

### Sheha

Results for the Sheha site are also presented on Figure 10a. Prospect for groundwater at Sheha area seems to be ok. The relatively better location for drilling at Sheha, where there seem to be a distinct potentially water bearing strata, is in the vicinity of VES-2 (target depths between 21 - 46m). The Sheha site is recommended for borehole construction. The indicated target depth at Sheha should be intersected as much as possible during drilling. Total depth of drilling at Sheha is recommended to be at least 50m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 10a for UTM coordinates of the relevant VES points.

### Wersege

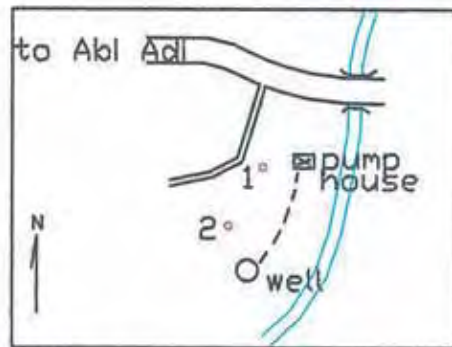
Results for the Wersege site are presented on Figure 10b. Prospect for groundwater at Wersege area seems to be ok. The location for drilling at Wersege is at the VES point (target depths between 80 – 110<sup>+</sup>m). At Wersege, the lower limit of the envisaged possible aquifer has not been reached. The Wersege site is recommended for borehole construction. The indicated target depth at Wersege should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 120m (or more, as required during drilling). The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 10b for UTM coordinates of the relevant VES point.



**Ves-1**

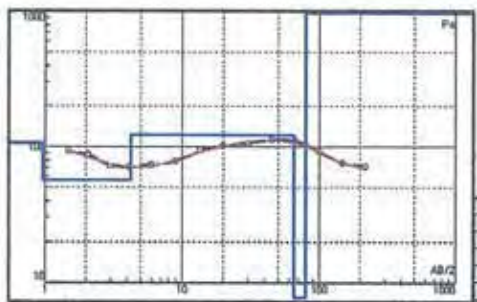
N	p	h	d	AB
1	24.8	0.75	0.75	1882
2	2.1	0.8385	0.7805	1882
3	121	7.55	8.331	1785
4	1835	5.89	14.22	1789
5	14.4	38.7	58.92	1752
6	1845			

	UTM-N	UTM-E	Elevation
Deda 1	1504154	498980	1803
Deda 2	1503989	498883	1805



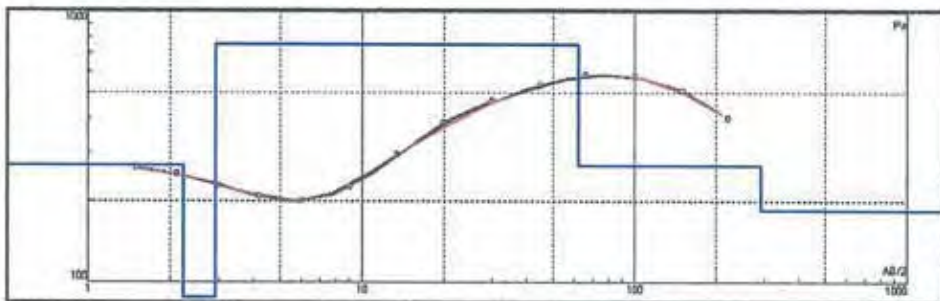
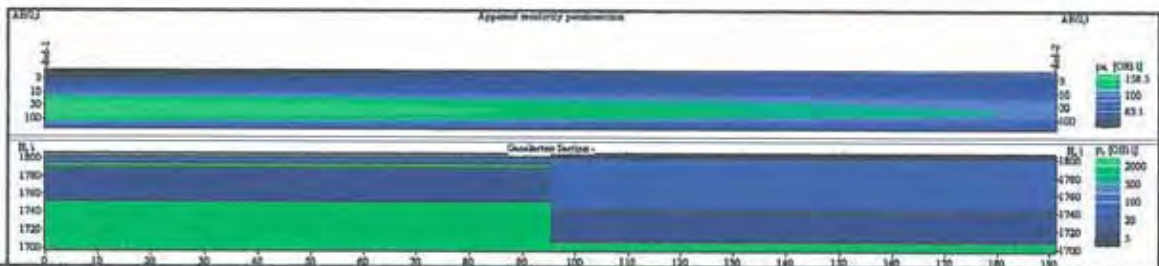
Deda VES point location

- new well (motorized)
- for Abi Adl



**Ves-2**

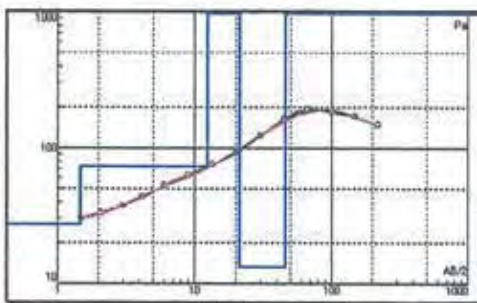
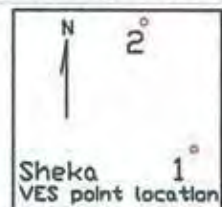
N	p	h	d	AB
1	100	0.958	0.958	1804
2	67.8	3.27	4.22	1801
3	125	88.5	84.7	1748
4	5.21	14.8	73.5	1728
5	1343			



**Ves-1**

N	p	h	d	AB
1	272.2	2.217	2.217	1881
2	21.83	0.3882	2.595	188
3	58.72	0.3281	2.505	188
4	756.7	59.13	62.64	1821
5	278.7	228.9	250.9	1592
6	185.9			

	UTM-N	UTM-E	Elevation
Sheka 1	1511600	501356	1883
Sheka 2	1511956	501215	1881



**Ves-2**

N	p	h	d	AB
1	27.28	1.47	1.47	188
2	73.84	10.95	12.43	1889
3	1793	8.594	21.12	188
4	13.21	24.49	45.81	1835
5	1342			

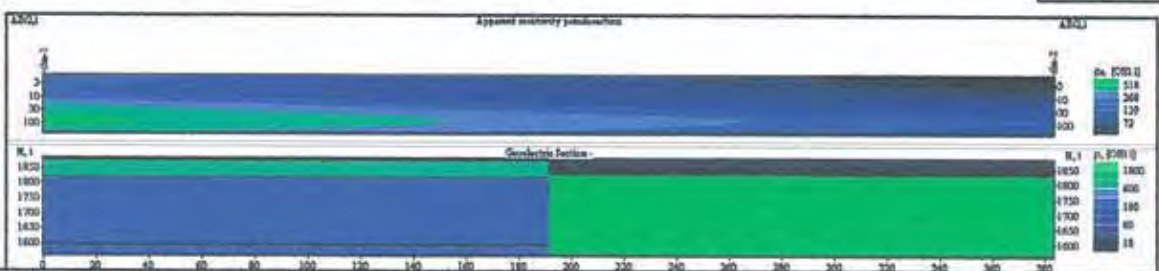


Figure 10a: Vertical Electrical Sounding results of Deda & Sheka sites (Kola Tenbilen woreda).

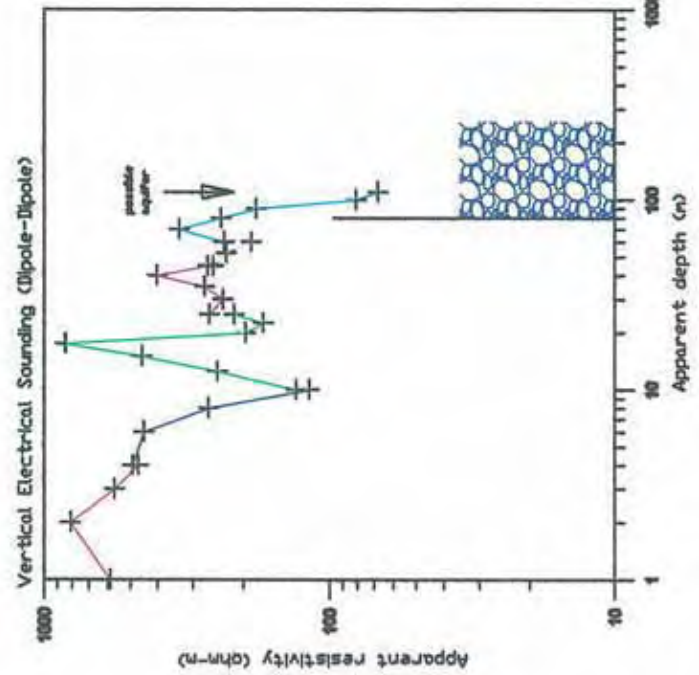
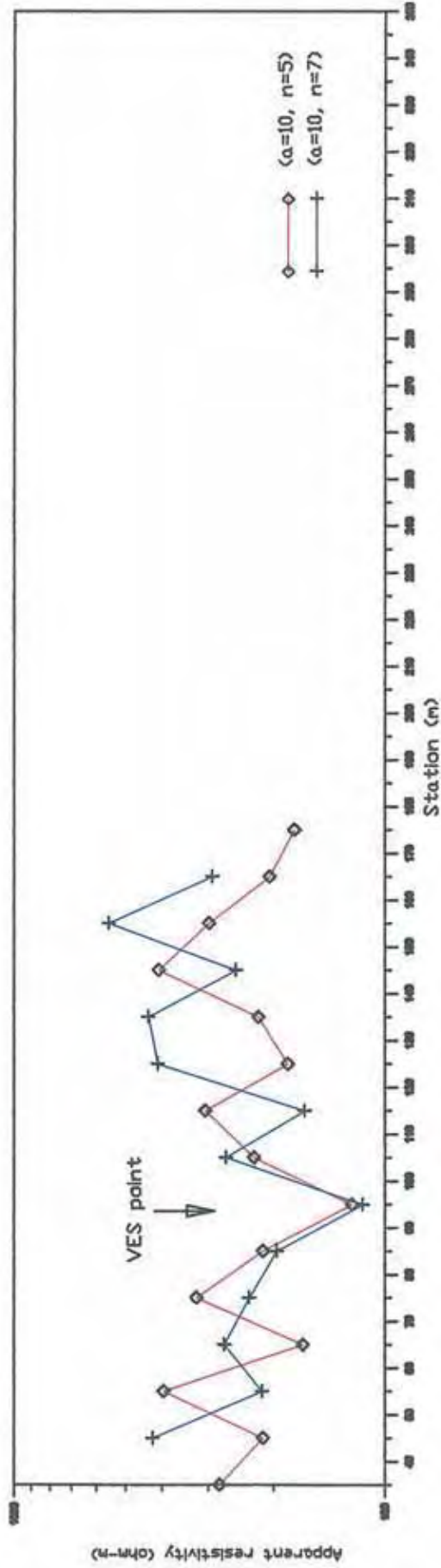


Figure 10b: Dipole-Dipole resistivity profiling and VES survey results of Wersege site (Kala Tembien woreda).

## **8.10 TANQUA ABERGELE WEREDA**

### **Gomenge-1**

Results for the Gomenge(1) site are presented on Figure 11a. Prospect for groundwater at Gomenge(1) area seems to be good. The location for drilling at Gomenge(1) is at the VES point (target depths between 15 – 90m). At Gomenge(1), multiple possible aquifers are envisaged. The Gomenge(1) site is recommended for borehole construction. The indicated target depth at Gomenge(1) should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 95m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 11a for UTM coordinates of the relevant VES point.

### **Hidmo-2**

Results for the Hidmo(2) site are presented on Figure 11b. Prospect for groundwater at Hidmo(2) area seems to be good. The location for drilling at Hidmo(2) is at the VES point (target depths between 20 – 70m). At Hidmo(2), multiple possible aquifers are envisaged. The Hidmo(2) site is recommended for borehole construction. The indicated target depth at Hidmo(2) should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 75m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 11b for UTM coordinates of the relevant VES point.

### **Gomenge-2**

Results for the Gomenge(2) site are presented on Figure 11c. Prospect for groundwater at Gomenge(2) area seems to be good. The location for drilling at Gomenge(2) is at the VES point (target depths between 20 – 100m). At Gomenge(2), multiple possible aquifers are envisaged. The Gomenge(2) site is recommended for borehole construction. The indicated target depth at Gomenge(2) should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 105m. The top few meters of the well should be grouted and sealed after drilling in order to avoid contamination while abstraction of water from deeper layers. Refer to either Table 3 or figure 11c for UTM coordinates of the relevant VES point.

### **Tekle Mekerina**

Results for the Tekle Mekerina site are presented on Figure 11d. Prospect for groundwater at Tekle Mekerina area seems to be ok. The location for drilling at Tekle Mekerina is at the VES point (target depths between 20 – 50m). At Tekle Mekerina, a single possible aquifer is envisaged. The Tekle Mekerina site is recommended for borehole construction. The indicated target depth at Tekle Mekerina should be intersected as much as possible during drilling. Total depth of drilling is recommended to be at least 55m. The top few meters of the well should be grouted



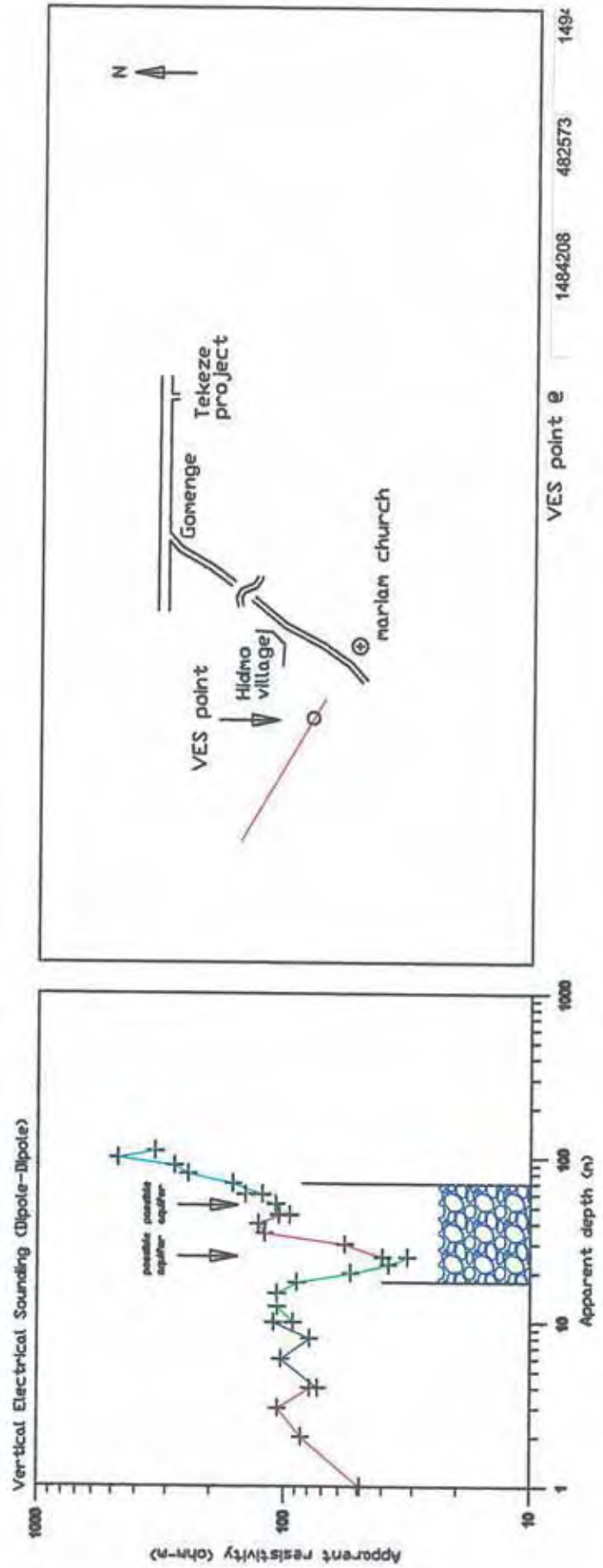
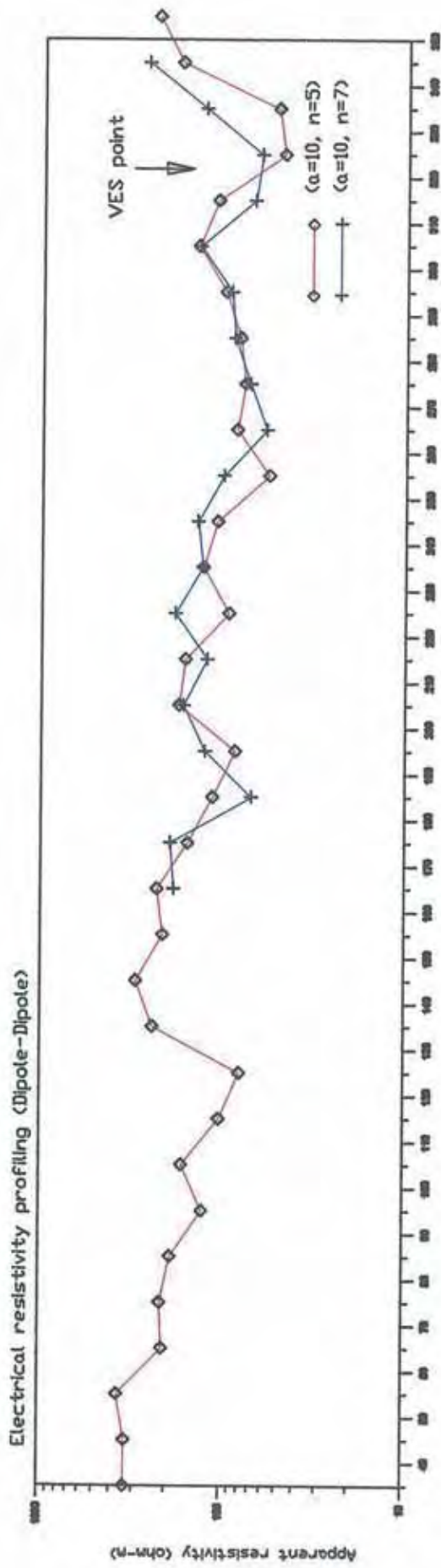


Figure 11b: Dipole-Dipole resistivity profiling and VES survey results of Hidma-2 site (Tanqua Abergele wereda).

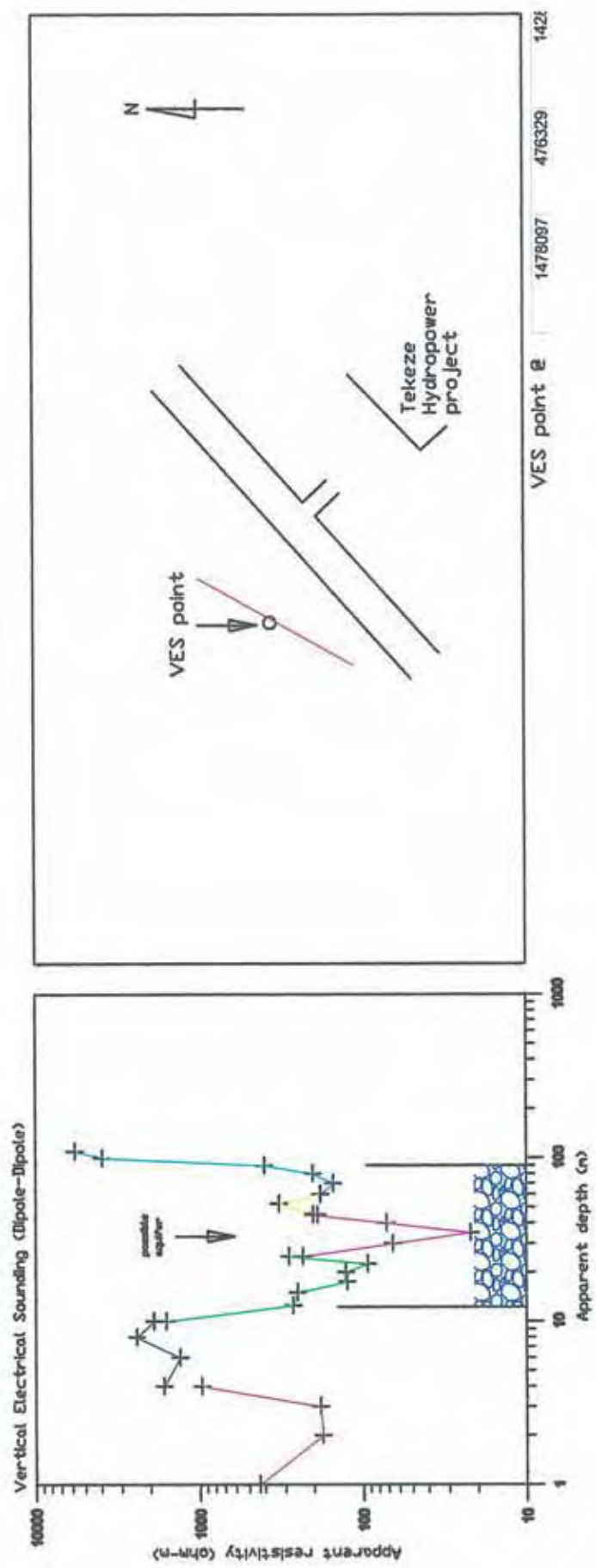
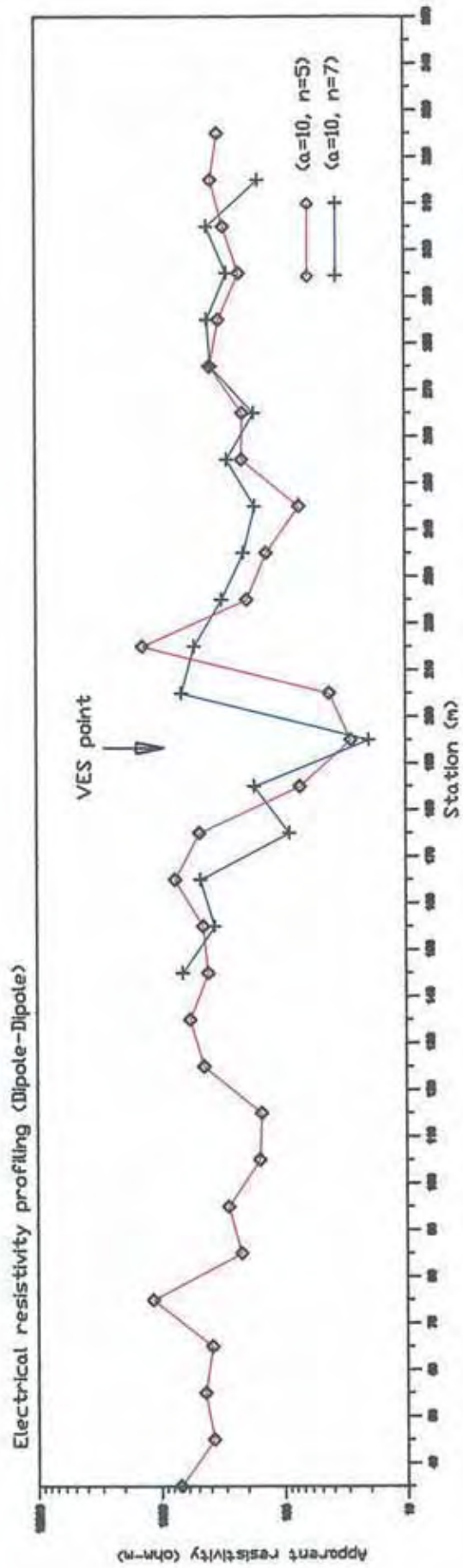


Figure 11a: Dipole-Dipole resistivity profiling and VES survey results of Gomenge-1 site (Tanqua Abergele wereda).

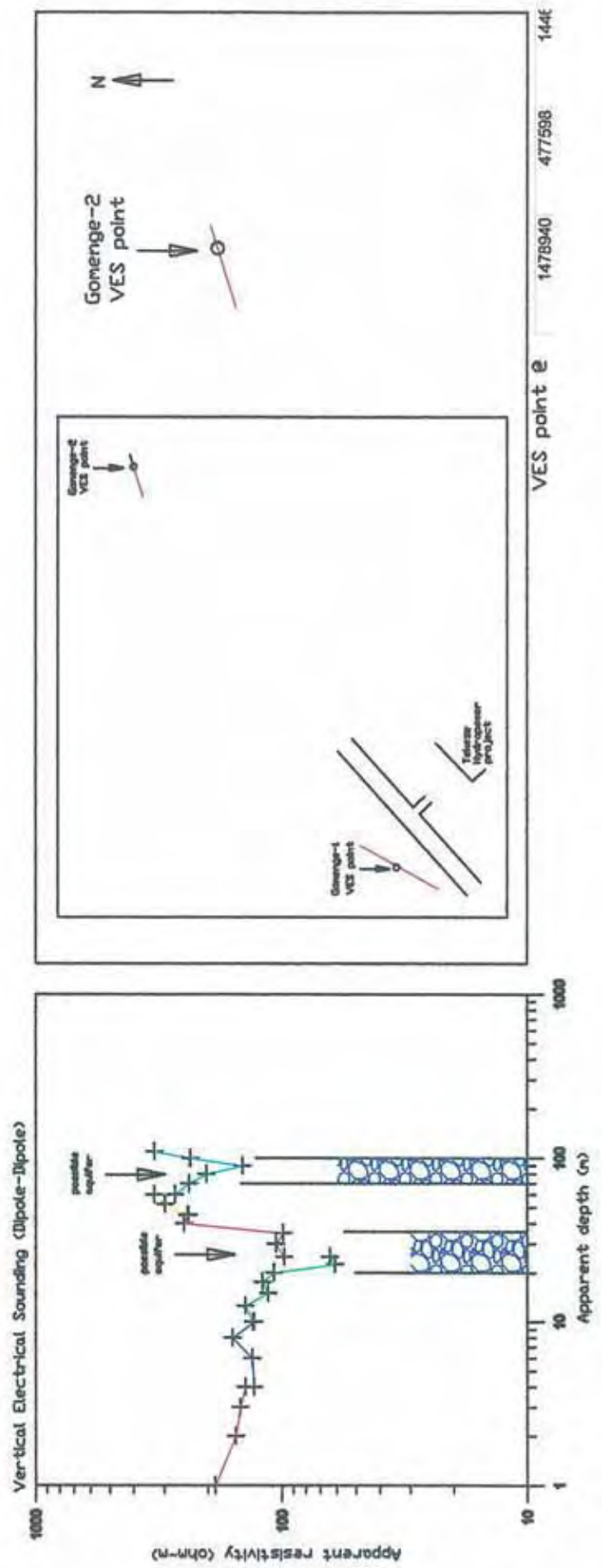
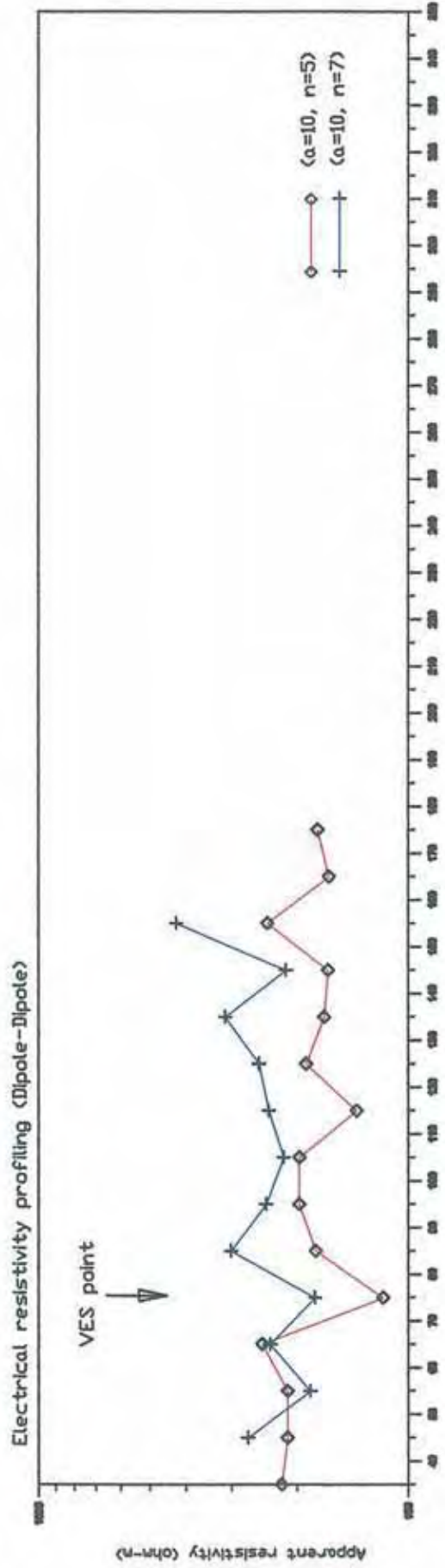


Figure 11c: Dipole-Dipole resistivity profiling and VES survey results of Gomenge-2 site (Tanqua Abergele woreda).

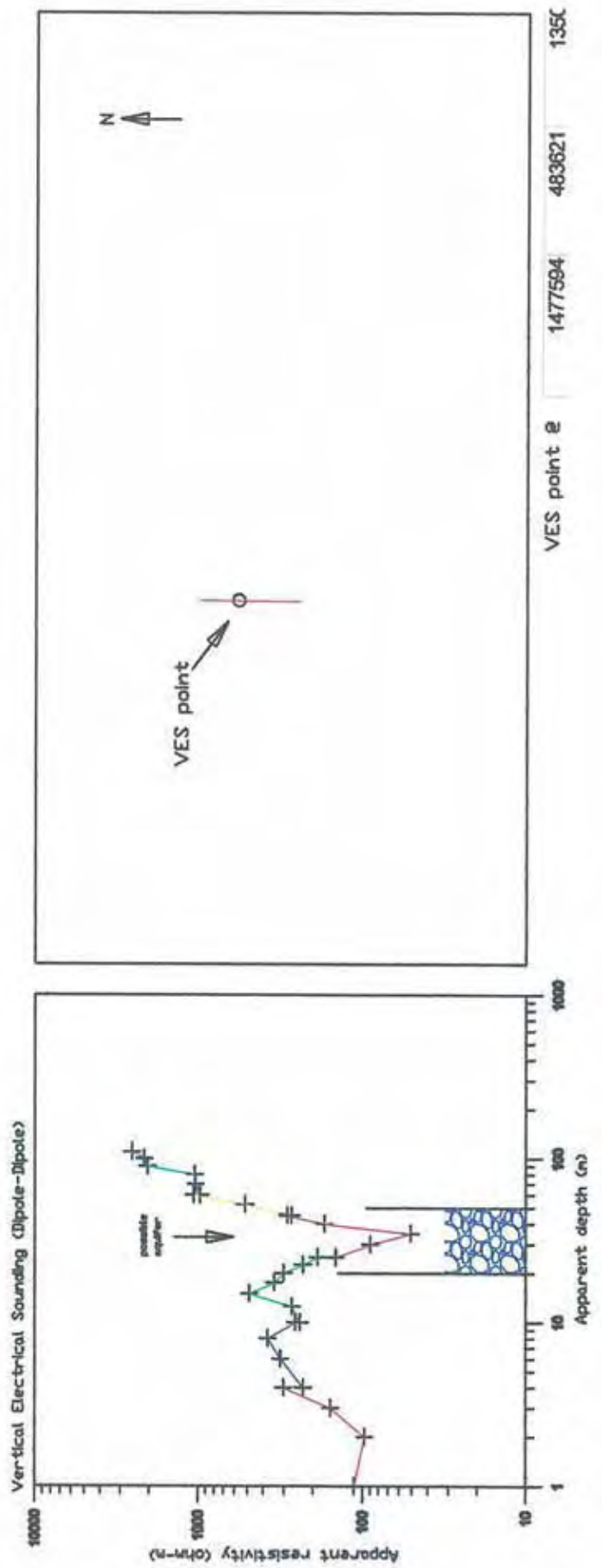
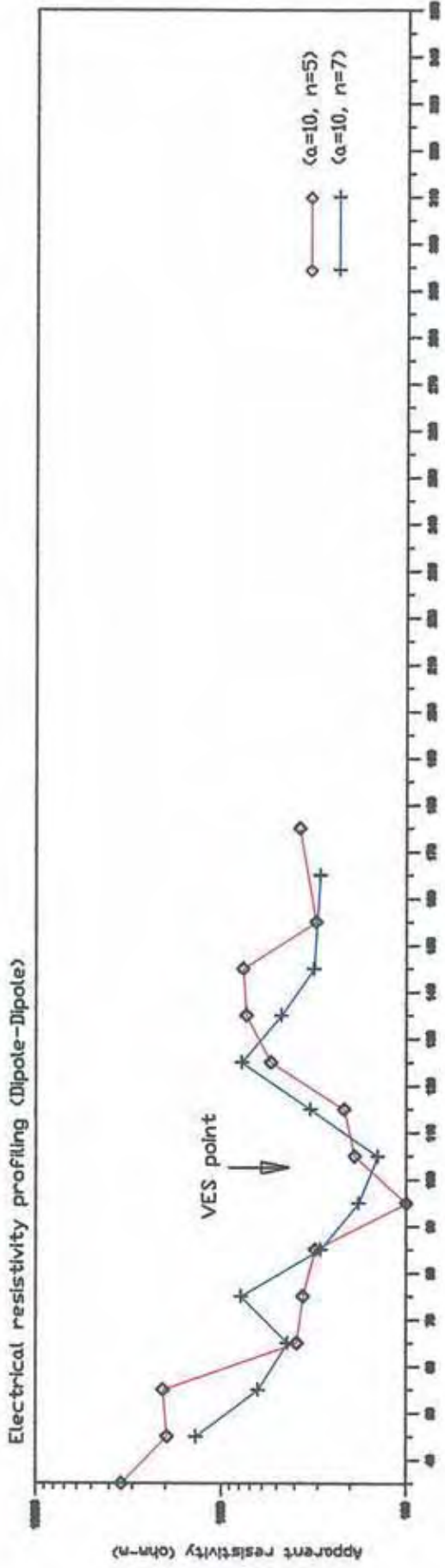
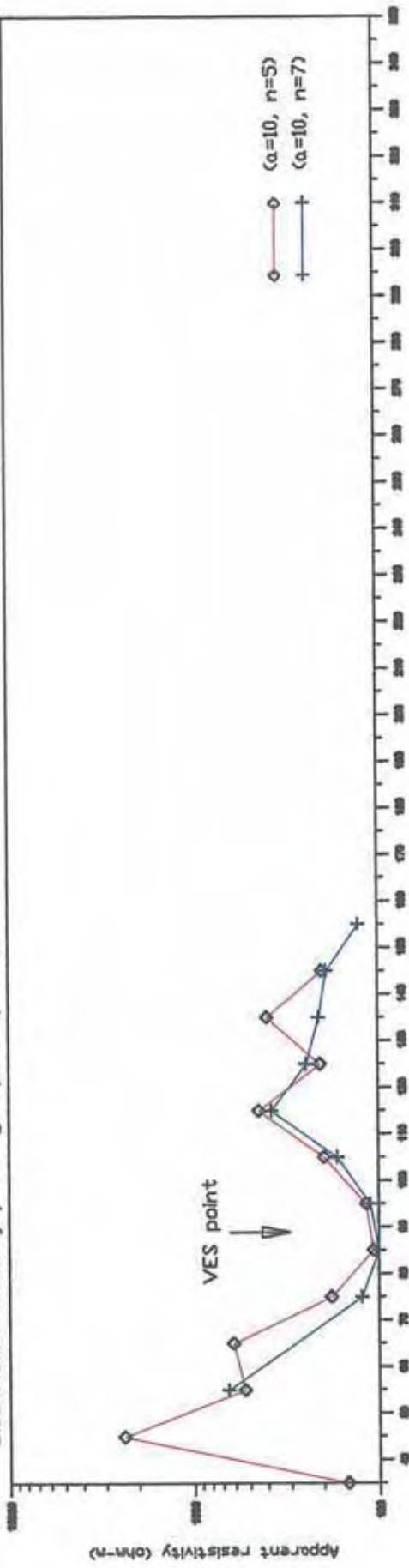


Figure 11d: Dipole-Dipole resistivity profiling and VES survey results of Tekle Mekerino site (Tanqua Abergele weredo).

Electrical resistivity profiling (Dipole-Dipole)



Vertical Electrical Sounding (Dipole-Dipole)

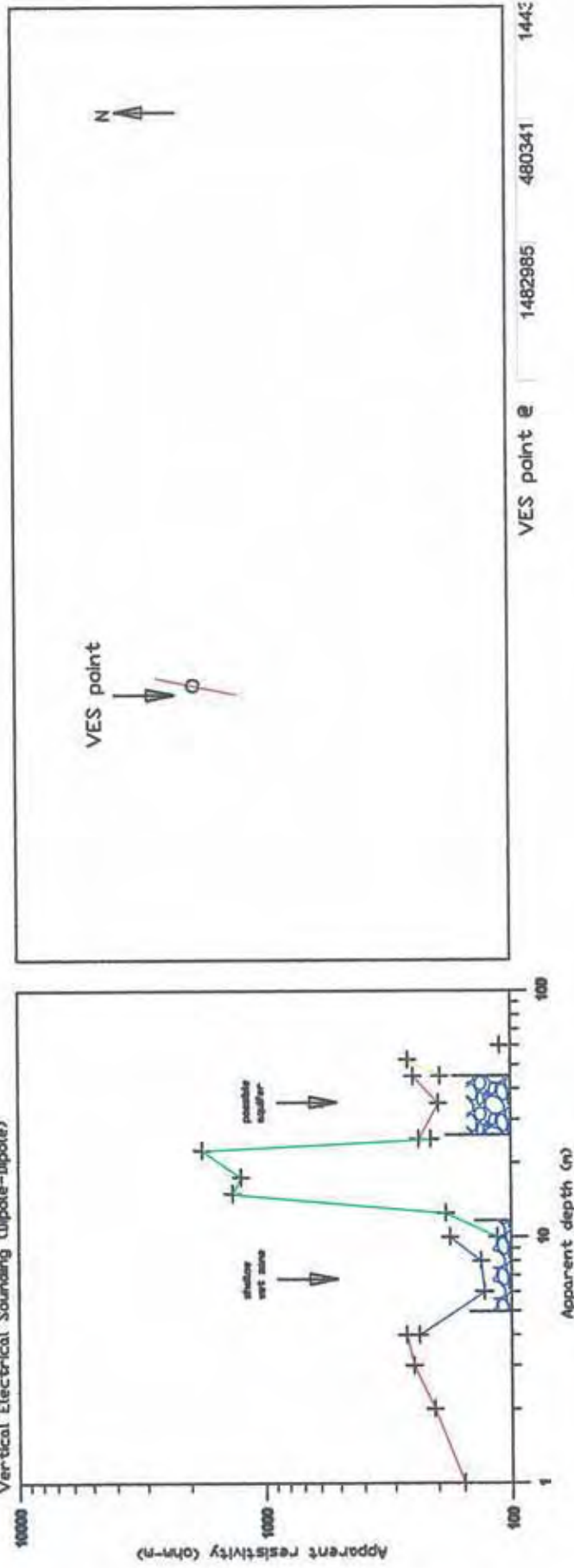


Figure 11e: Dipole-Dipole resistivity profiling and VES survey results of Hidmo-1 site (Tanqua Abergele woreda).

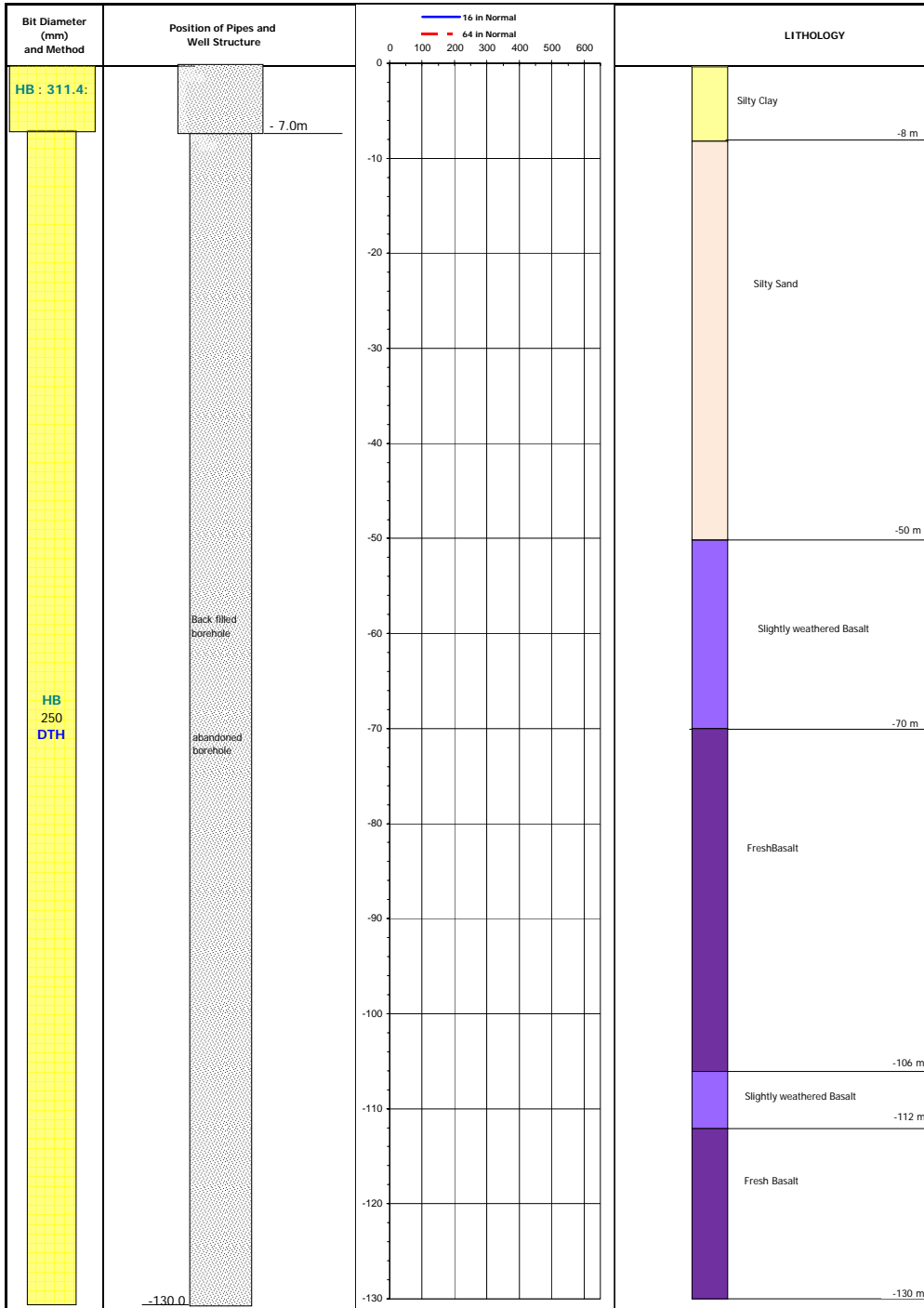
(3) 試掘結果

B/H No.	B/H Name	Coordination			Construction Periods	Drilling Depth (m)	Drilling Diameter (inches)	Drilling Method	Casing Depth (m)	Casing Diameter (inches)	Screen Length (m)	Screen Position	Pumping Test Periods	SWL (m)	Pumping Rate (L/min)	DWL (m)	Note
		UTM E	UTM N	Elevation (m)													
JAL001	Bubie	565809	1382784	1507	Feb 12-Feb 13	0-7 7-130	12 10	DTH DTH	-	-	-	-	-	-	-	-	Dry hole
JAL002	Bedena Ieko	Departed from our original plan as a new site to our modified plan as a rehabilitation site.															
JAL003	Walka	558871	1365094	1609	Feb 10-Feb 11	0-7 7-130	12 10	DTH DTH	-	-	-	-	-	-	-	-	Dry hole
JAL004	Gerjele town	566848	1377985	1456	Feb 6-Feb 9	0-6 6-78	12 10	DTH DTH	70	6	30	36-66		23.71	336	25.23	
JAL005	Ula	563980	1382410	1576	Feb 14-Feb 16	0-6 6-130	12 10	DTH DTH	130	6	33	75-102 120-126		46.28	180	73.03	
JRA001-2	Hadealga	581069	1397121	1501	Jan 16-Feb 5	0-6 18-135	12 10	DMCD DMCD	120	6	18	84-90 96-102 108-114		34.74	336	58.4	
JRA002-1	Hirka 1	575520	1416591	1688	Jan 18-Jan 20	0-22 22-130	12 10	DTH DTH	-	-	-	-		-	-	-	Dry hole
JRA002-2	Hirka 2	574088	1410202	1649	Feb 12-Feb 14	0-6 6-82	12 10	DTH DTH	78	6	24	48-72		49.95	336	50.8	
JRA003	Fondel	568796	1402214	1684	Jan 25-Jan 28	0-8 8-130	12 10	DTH DTH	130	6	36	82-118		77.5	60	99.45	
JRA004	Dodota	580236	1382891	1670	Jan 16-Jan 18	0-2 2-100	12 10	DTH DTH	98	6	24	32-38 68-80 86-92		13.48	60	45.8	
JRA005	Hadishkign	579645	1389905	1535	Feb 9-Feb 12	0-18 18-142	12 10	DTH DTH	140	6	24	82-88 100-106 124-136		74.46	120	83.4	
JRA006	Gemed dadi	567198	1399067	1679	Jan 29-Feb 5	0-6 6-102 102-130	12 10 10	DTH DTH DMCD	130	6	30	78-108		49.73	300	51.51	
JRA007	Tachgubegala	574788	1367533	1391	Feb 16-Feb 18	72	0-6 6-72	DTH DTH	58	6	18	40-58		18.10	336	27.42	
JHW001	Dengolat	535230	1469777	2036	Feb 19-Feb 20	0-6 6-137	12 10	DTH DTH	-	-	-	-		-	-	-	Dry hole

## 1) 井戸柱状図

**Bobie Test Borehole (Dry Well)**

Well No. <i>JAL001</i>	Location <i>Bobie</i>	Coordinate (UTM) <i>565809</i>	Altitude <i>1382784</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>
Date: from <i>Feb. 12, 2007</i>	to <i>Feb. 13, 2007</i>	Drilling : Equipment Type	Method <i>DTH</i>	Flow	Depth	Depth	Final Depth <i>-130</i>
Casing Type :	Type	Inside Dia.	Outside Dia.	Joint Type	Installation depth: <i>Dry well</i>	Total Length	
Screen Pipe :	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
Gravel Pakking	Origin	Gravel Size	Location	Volume	Development :	Static Water Level	Method
Submersible pump :	Installation Date : not installed						



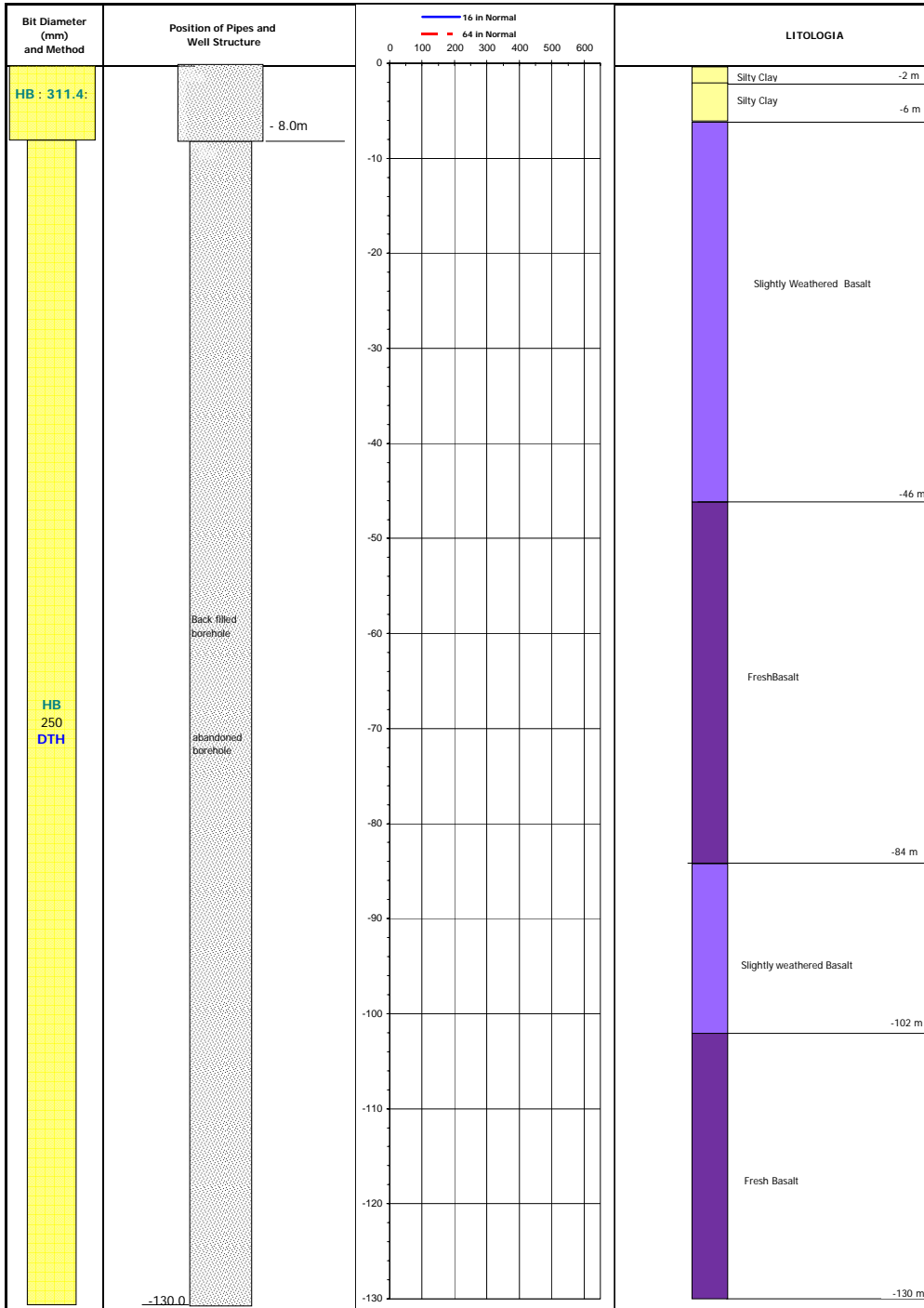
**SIMBOL:**

HB = Hammer Bit	CO = Concrete	PC = PVC Casing
TB = Tricon Bit	G = Grabel Pacing	S = Screen
RM = Rotary with mud water	BS = Bentnaite sealed	P = Pump Position
DTH = Drilled with air		



### Walka Test Borehole (Dry hole)

Well No. <i>JAL003</i>	Location <i>Walka</i>	Coordinate (UTM) <i>558871</i>	Altitude <i>1,609 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>		
Date: from <i>Feb. 10, 2007</i> to <i>Feb. 11, 2007</i>		Drilling: Equipment Type		Method <i>DTH</i>	Flow	Depth	Depth	Final Depth <i>-130</i>	
Casing Type: Type		Inside Dia.	Outside Dia.	Joint Type	Installation depth: <i>Dry well</i>		Total Length		
Screen Pipe: Material		Diameter	Silot Size	Open Rate	Joint Type	Installation depth:		Total Length	
Observation Pipe: Material		Diameter	Silot Size	Open Rate	Joint Type	Installation depth:		Total Length	
Gravel Pakking: Origin		Gravel Size	Location	Volume	Development: Static Water Level		Method	Duration	Discharge
Submersible pump:		Installation Date: <i>not installed</i>							

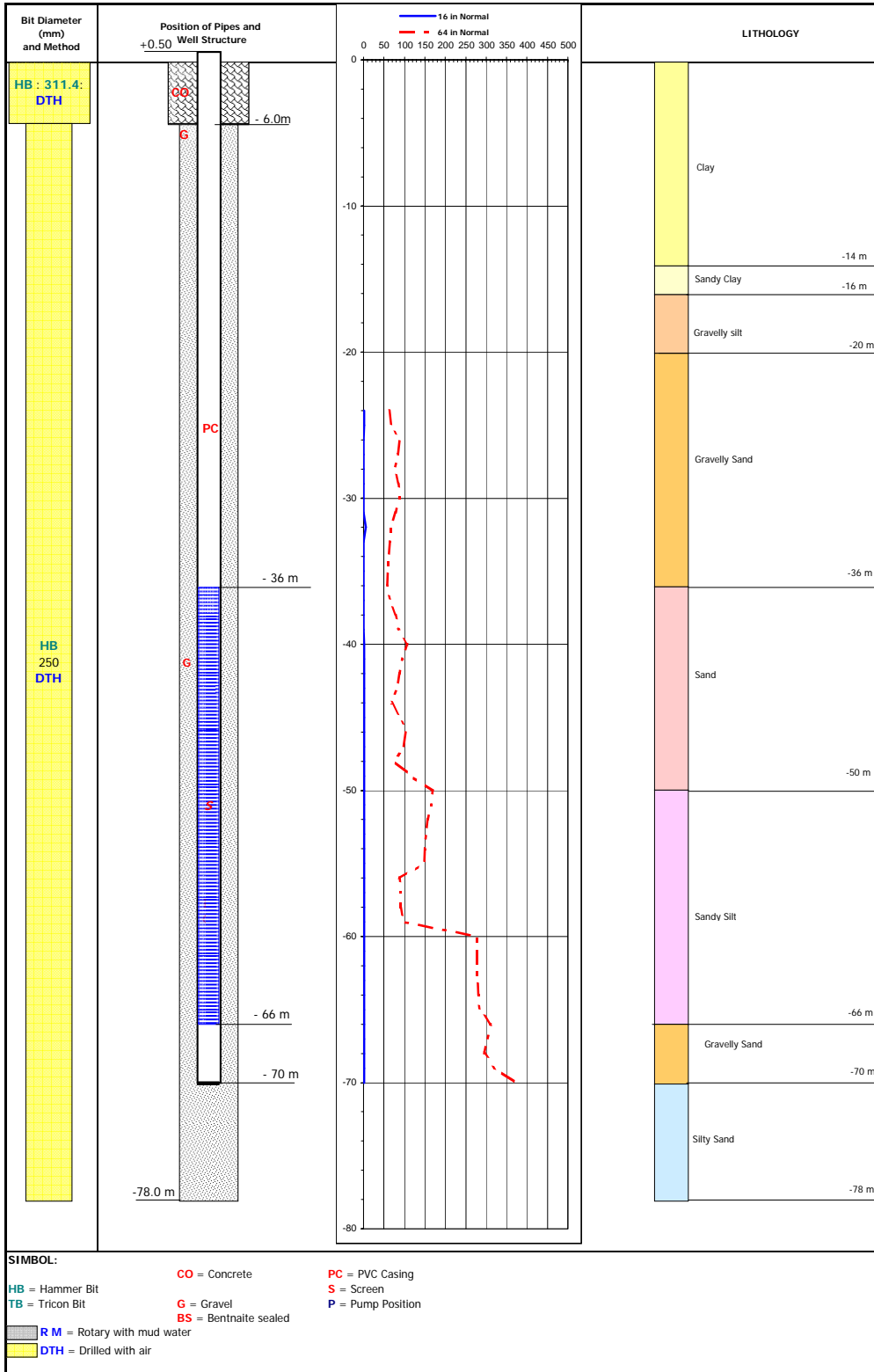


**SIMBOL:**

HB = Hammer Bit	CO = Concrete	PC = PVC Casing
TB = Tricon Bit	G = Gravel Pacing	S = Screen
RM = Rotary with mud water	BS = Bentnaite sealed	P = Pump Position
DTH = Drilled with air		

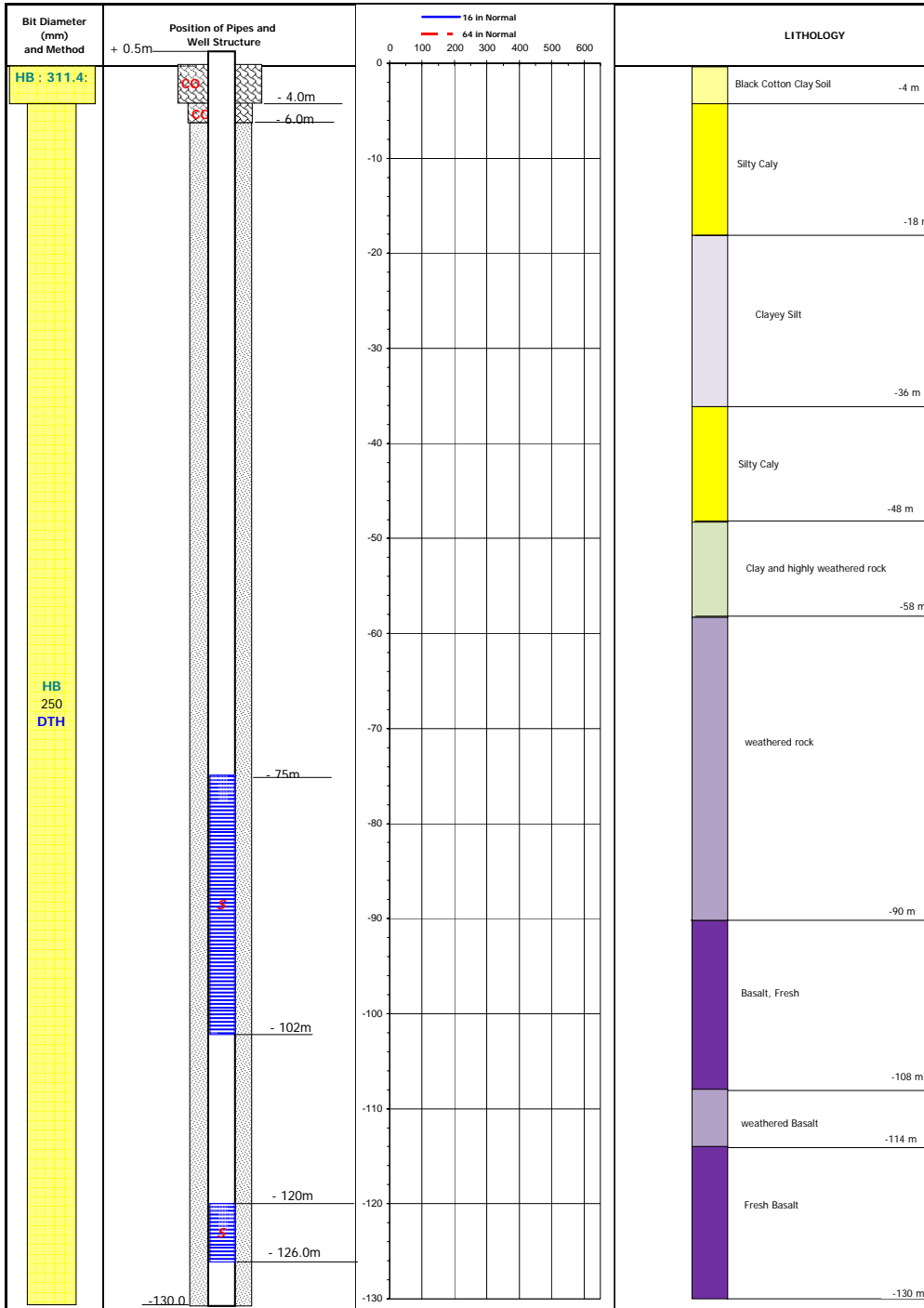
### Gerjele Test Borehole

Well No. <i>JAL004</i>	Location <i>Gerjele</i>	Coordinate (UTM) <i>566848</i>	Altitude <i>1,456 m</i>	Town <i>Gerjele town</i>	Wareda	State <i>Tigray</i>	Country <i>Ethiopia</i>
Date: from <i>Feb. 6, 2007</i> to <i>Feb. 9, 2007</i>		Drilling: Equipment Type <i>DTH</i>		Method <i>DTH</i>	Flow <i>Flow</i>	Depth <i>-78</i>	Final Depth <i>-70</i>
Casing Type : <i>PVC</i>		Type <i>6"</i>	Inside Dia. <i>150.0mm</i>	Outside Dia. <i>165.0mm</i>	Joint Type <i>Screw+welding</i>	Installation depth: <i>+0.5 -36</i>	Total Length <i>-40</i>
Screen Pipe : <i>PVC</i>		Material	Diameter <i>150.0mm</i>	Silot Size <i>1.0mm</i>	Open Rate <i>10%</i>	Joint Type <i>Screw</i>	Installation depth: <i>-36 -66</i>
Observation Pipe:		Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth: <i>-36 -66</i>
Gravel Pakking		Origin	Gravel Size <i>ø 6-9mm</i>	Location	Volume	Development : <i>Static Water Level</i>	Method <i>GL -23.7m</i>
Submersible pump :		Installation Date : <i>not installed</i>					



### Ula Ula Test Borehole

Well No. <i>JAL005</i>	Location <i>Ula Ula</i>	Coordinate (UTM) <i>563980</i>	Altitude <i>1,576 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>
Date: from <i>Feb. 14, 2007</i> to <i>Feb. 16, 2007</i>	Drilling : Equipment Type <i>DTH</i>	Method <i>DTH</i>	Flow	Depth <i>-130</i>	Depth	Depth	Final Depth <i>-130</i>
Casing Type : Type	Inside Dia.	Outside Dia.	Joint Type	Installation depth: <i>+0.5 - 75</i>	<i>102 - 120</i>	<i>126 - 130</i>	Total Length <i>97.5m</i>
Screen Pipe : Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth: <i>75 - 102</i>	<i>120 - 126</i>	Total Length <i>33.0m</i>
Observation Pipe: <i>CS Pipe</i>	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
Gravel Pakking	Origin	Gravel Size	Location	Volume	Development : <i>GL -46.1m</i>	Method	Duration
Submersible pump :	Installation Date :	not installed					

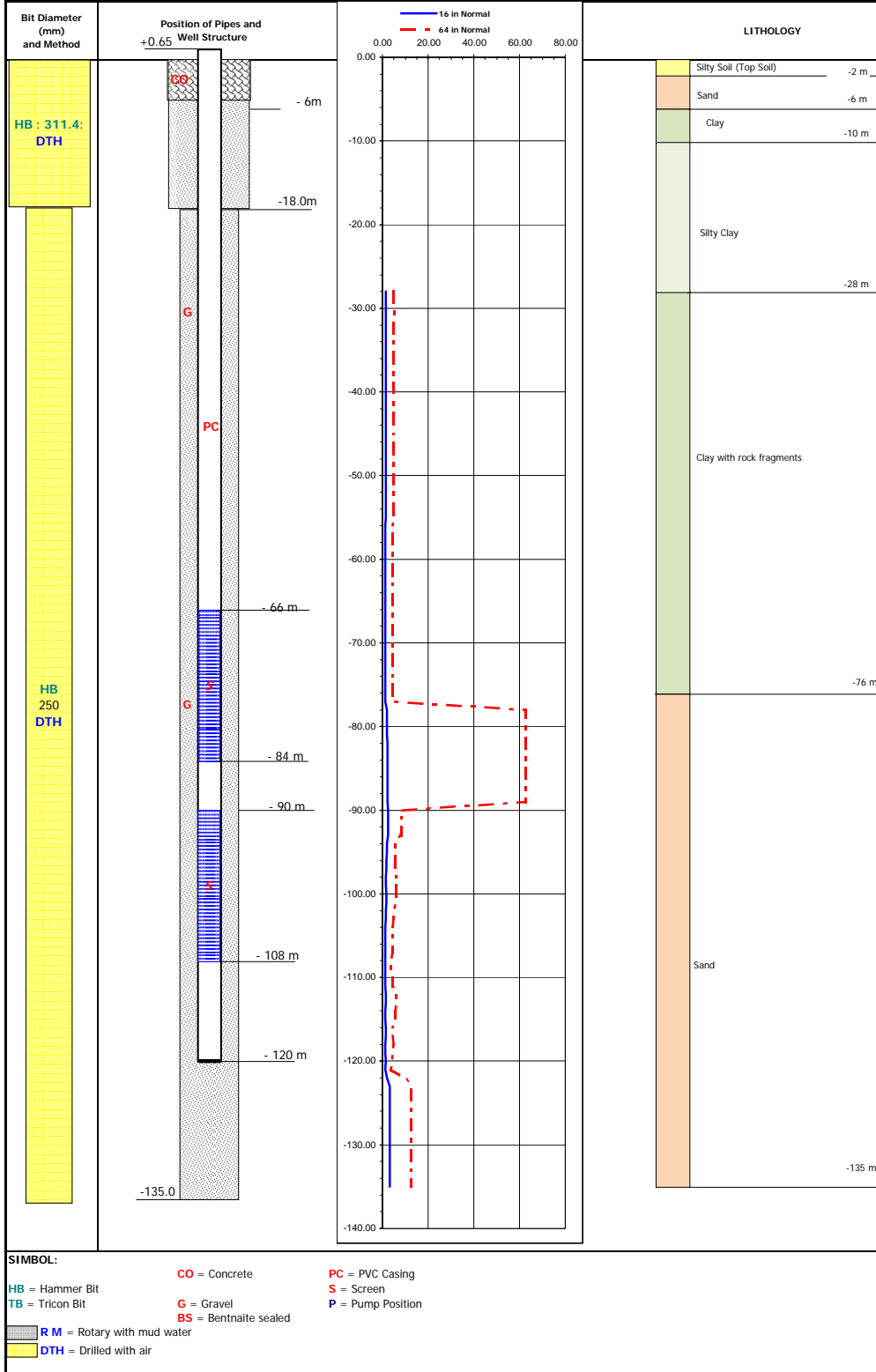


**SIMBOL:**

HB = Hammer Bit	CO = Concrete	PC = PVC Casing
TB = Tricon Bit	G = Grabel Pacing	S = Screen
	BS = Bentnaite sealed	P = Pump Position
	R M = Rotary with mud water	
	DTH = Drilled with air	

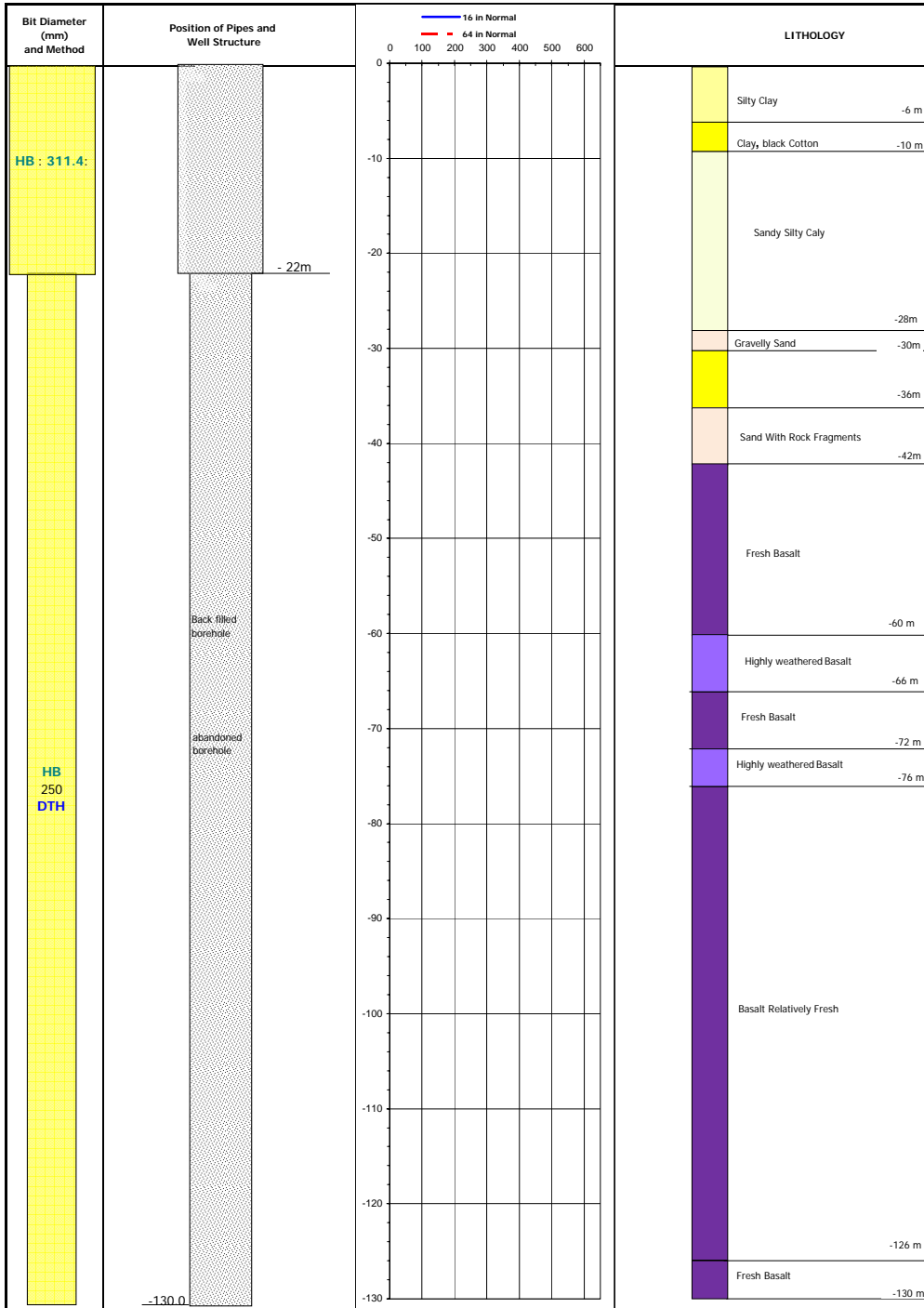
### Hadealga Test Borehole

Well No. <i>JR4001</i>	Location <i>Hadealga</i>	Coordinate (UTM) <i>581069</i>	Altitude <i>1,501 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>
Date: from <i>Jan. 16, 2007</i> to <i>Feb. 05, 2007</i>	Drilling:	Equipment Type	Method <i>DTH</i>	Flow	Depth <i>-135</i>	Depth	Final Depth <i>-120</i>
Casing Type : <i>PVC</i>	Type <i>6"</i>	Inside Dia. <i>150.0mm</i>	Outside Dia. <i>165.0mm</i>	Joint Type <i>Screw-welding</i>	Installation depth: <i>+0.65 -66;</i>	<i>-84 - 90;</i>	Total Length <i>84.0m</i>
Screen Pipe : <i>PVC</i>	Material	Diameter <i>150.0mm</i>	Silot Size <i>1.0mm</i>	Open Rate <i>10%</i>	Joint Type <i>Screw</i>	Installation depth: <i>-66 - 84;</i>	Total Length <i>36.0m</i>
Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
Gravel Pakking	Origin	Gravel Size <i>ø 6-9mm</i>	Location	Volume	Development : <i>Static Water Level</i>	Method <i>GL -34.7m</i>	Duration
Submersible pump :	Installation Date : <i>not installed</i>						



### Hirka No.1 Test Borehole (Dry Well)

Well No. <i>JRA002-1</i>	Location <i>Hirka No.1</i>	Coordinate (UTM) <i>575520 1416591</i>	Altitude <i>1,688 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>
Date: from <i>Jan. 18, 2007</i> to <i>Jan. 20, 2007</i>		Drilling : Equipment Type <i>DTH</i>		Method <i>DTH</i>	Flow	Depth	Final Depth <i>-130</i>
Casing Type : Type		Inside Dia.	Outside Dia.	Joint Type	Installation depth: <i>Dry well</i>		Total Length
Screen Pipe :		Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth: Total Length
Observation Pipe:		Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth: Total Length
Gravel Pakking		Origin	Gravel Size	Location	Volume	Development : Static Water Level Method Duration Discharge	
Submersible pump :		Installation Date : not installed					



**SIMBOL:**

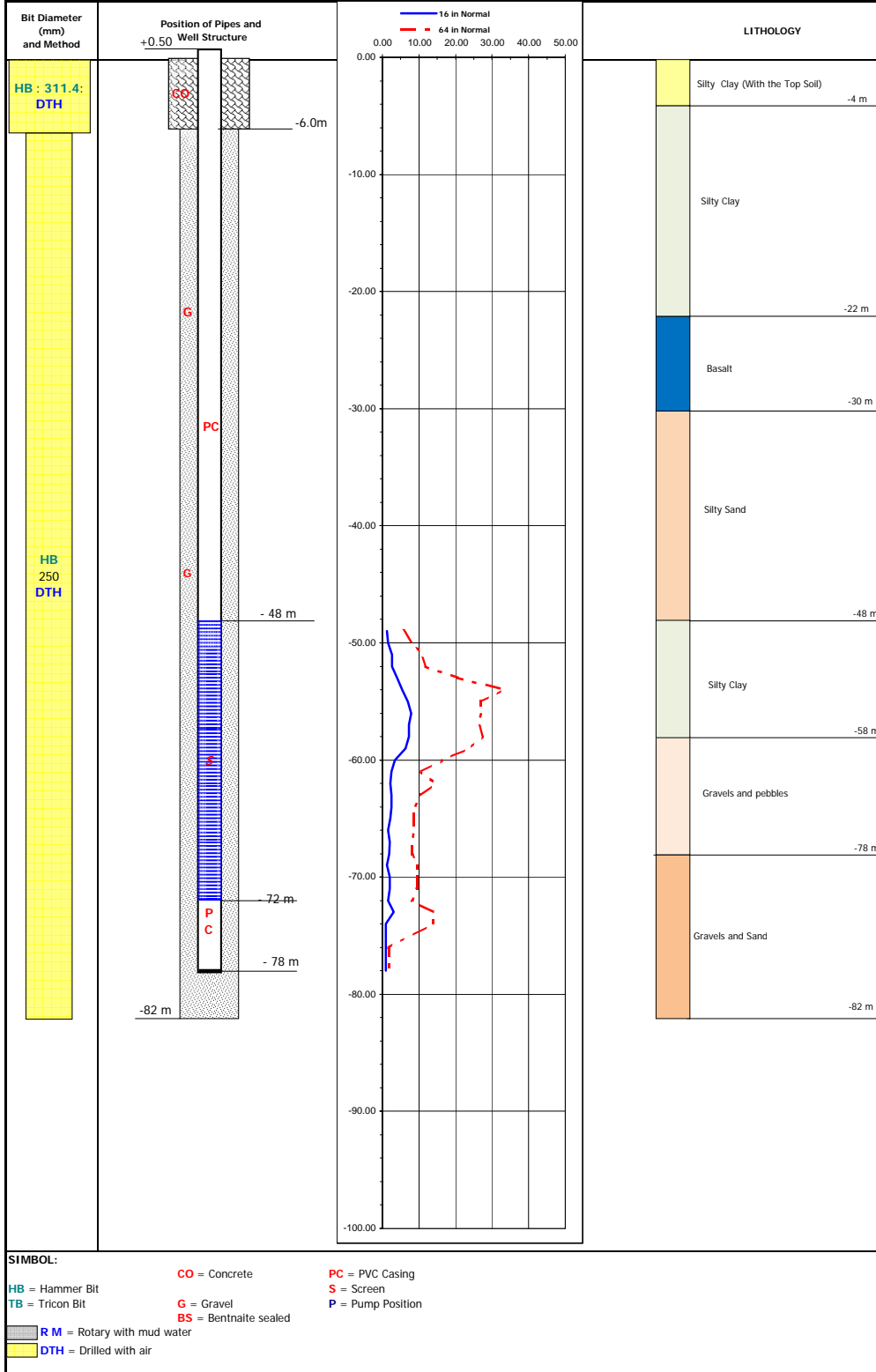
HB = Hammer Bit  
TB = Tricon Bit  
R M = Rotary with mud water  
DTH = Drilled with air

CO = Concrete  
G = Grabel Pacing  
BS = Bentnaite sealed

PC = PVC Casing  
S = Screen  
P = Pump Position

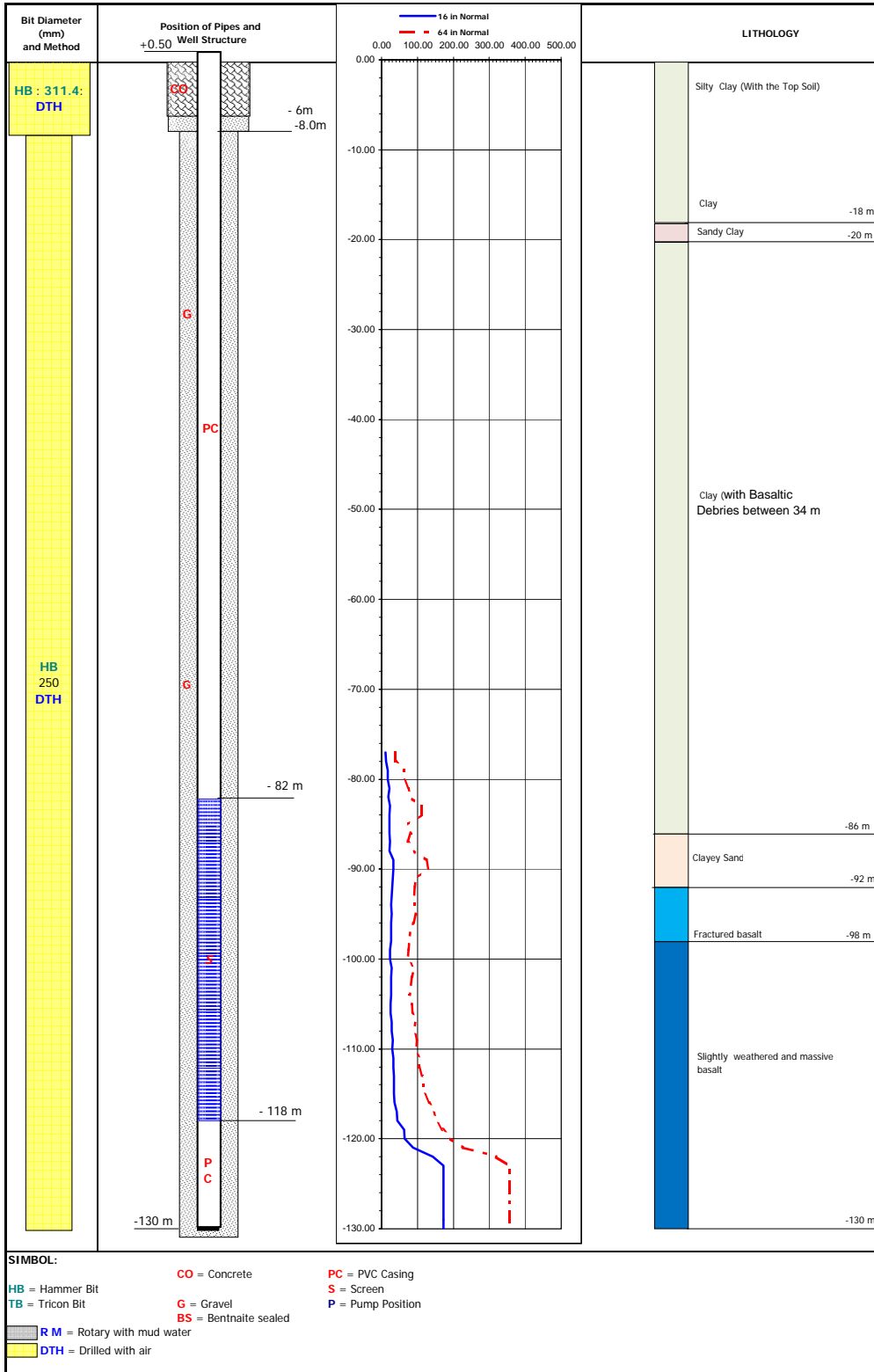
### Hirka No.2 Test Borehole

Well No. <i>JRA002-2</i>	Location <i>Hirka No. 2</i>	Coordinate (UTM) <i>574088 1410202</i>	Altitude <i>1,649 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>
Date: from <i>Feb. 12, 2007</i> to <i>Feb. 14, 2007</i>	Drilling :	Equipment Type	Method <i>DTH</i>	Flow	Depth <i>-82</i>	Depth	Final Depth <i>-78</i>
Casing Type : <i>PVC</i>	Type <i>6"</i>	Inside Dia. <i>150.0mm</i>	Outside Dia. <i>165.0mm</i>	Joint Type <i>Screw+welding</i>	Installation depth: <i>+0.65 -48; -72 - 78;</i>	Total Length <i>54.0m</i>	
Screen Pipe : <i>PVC</i>	Material	Diameter <i>150.0mm</i>	Silot Size <i>1.0mm</i>	Open Rate <i>10%</i>	Joint Type <i>Screw</i>	Installation depth: <i>-48 - 72;</i>	Total Length <i>24.0m</i>
Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
Gravel Pakking	Origin	Gravel Size <i>ø 6-9mm</i>	Location	Volume	Development : <i>GL -50.0m</i>	Static Water Level	Method Duration Discharge
Submersible pump : Installation Date : not installed							



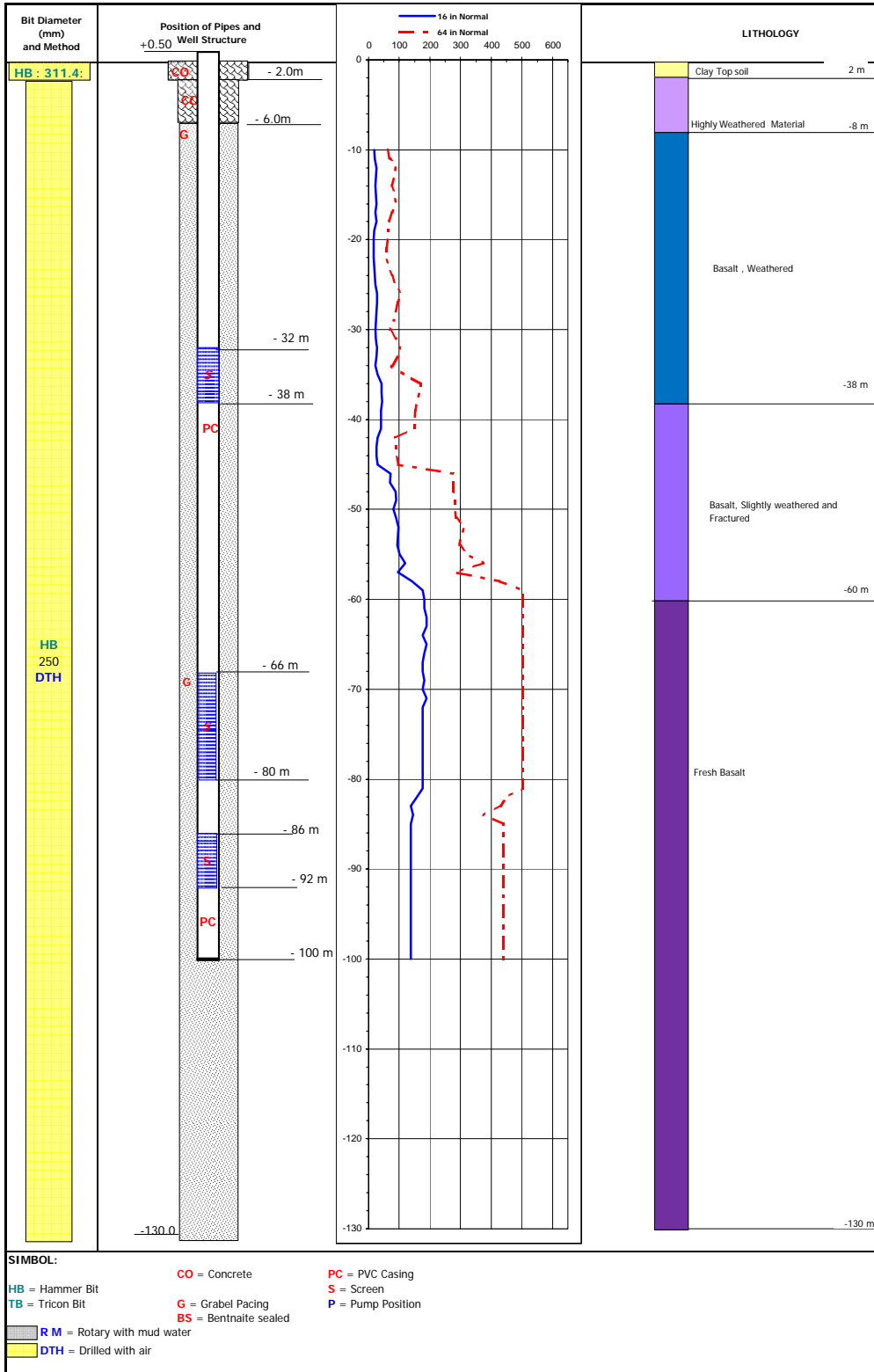
### Fondel Test Borehole

Well No.	Location	Coordinate (UTM)	Altitude	Town	Wareda	State	Cuntry		
JRAD03	Fondel	568796 1402214	1,684 m			Tigray	Ethiopia		
Date: from to		Drilling:	Equipment Type	Method	Flow	Depth	Depth	Final Depth	
Feb. 12, 2007 Feb. 14, 2007				DTH				-130	
Casing Type:	Type	Inside Dia.	Outside Dia.	Joint Type	Installation depth:			Total Length	
PVC	6"	150.0mm	165.0mm	Screw-welding	+0.5 -82	-118 - 130		94.0m	
Screen Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length		
PVC		150.0mm	1.0mm	10%	Screw	-82 - 118	36.0m		
Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length		
Gravel Packing	Origin	Gravel Size	Location	Volume	Development:	Static Water Level	Method	Duration	Discharge
		ø 6-9mm				GL -77.5m			
Submersible pump:		Installation Date: not installed							



### Dodota Test Borehole

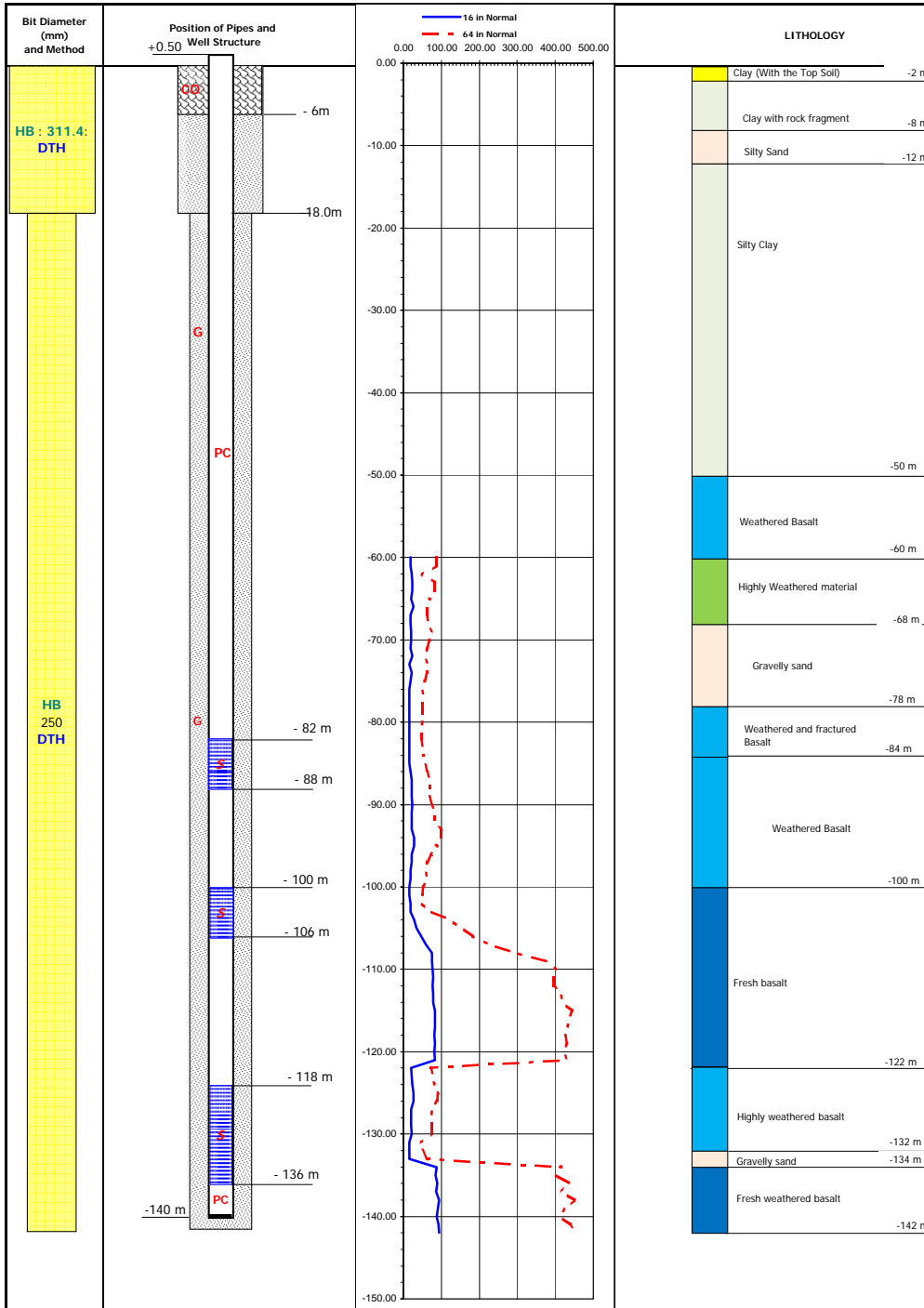
Well No. <i>JR4004</i>	Location <i>Dodota</i>	Coordinate (UTM) <i>580236</i>	Altitude <i>1,670 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>		
Date: from <i>Jan. 16, 2007</i> to <i>Jan. 18, 2007</i>	Drilling:	Equipment Type	Method <i>DTH</i>	Flow	Depth <i>-130</i>	Depth	Final Depth <i>-130</i>		
Casing Type: <i>PVC</i>	Type <i>6"</i>	Inside Dia. <i>150.0mm</i>	Outside Dia. <i>165.0mm</i>	Joint Type <i>Screw-welding</i>	Installation depth: <i>+0.5 - 62.7;</i>	<i>-74.02 - 108.46;</i>	<i>-125.5 - 131.0;</i>	Total Length <i>98.0m</i>	
Screen Pipe: <i>PVC</i>	Material	Diameter <i>150.0mm</i>	Silot Size <i>1.0mm</i>	Open Rate <i>10%</i>	Joint Type <i>Screw</i>	Installation depth: <i>-32-38;</i>	<i>-68-80;</i>	<i>-86-92;</i>	Total Length <i>28.4m</i>
Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:		Total Length	
Gravel Pakking	Origin	Gravel Size	Location	Volume	Development: <i>GL -13.5m</i>	Static Water Level	Method	Duration	Discharge
Submersible pump:	Installation Date: <i>not installed</i>								





### Hadishkign Test Borehole

Well No. <i>JRA005</i>	Location <i>Hadishkign</i>	Coordinate (UTM) <i>579645</i>	Altitude <i>1,535 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>
Date: from <i>Feb. 9, 2007</i> to <i>Feb. 11, 2007</i>		Drilling:	Equipment Type	Method	Flow	Depth	Final Depth
				<i>DTH</i>		<i>-142</i>	<i>-140</i>
Casing Type:	Type	Inside Dia.	Outside Dia.	Joint Type	Installation depth:	Total Length	
<i>PVC</i>	<i>6"</i>	<i>150.0mm</i>	<i>165.0mm</i>	<i>Screw-welding</i>	<i>+0.5 -82-</i>	<i>116.0m</i>	
Screen Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
<i>PVC</i>		<i>150.0mm</i>	<i>1.0mm</i>	<i>10%</i>	<i>Screw</i>	<i>-82 -88-</i>	<i>24.0m</i>
Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
Gravel Packing	Origin	Gravel Size	Location	Volume	Development:	Static Water Level	Method
		<i>φ 6-9mm</i>				<i>GL -77.5m</i>	
Submersible pump:		Installation Date: <i>not installed</i>					

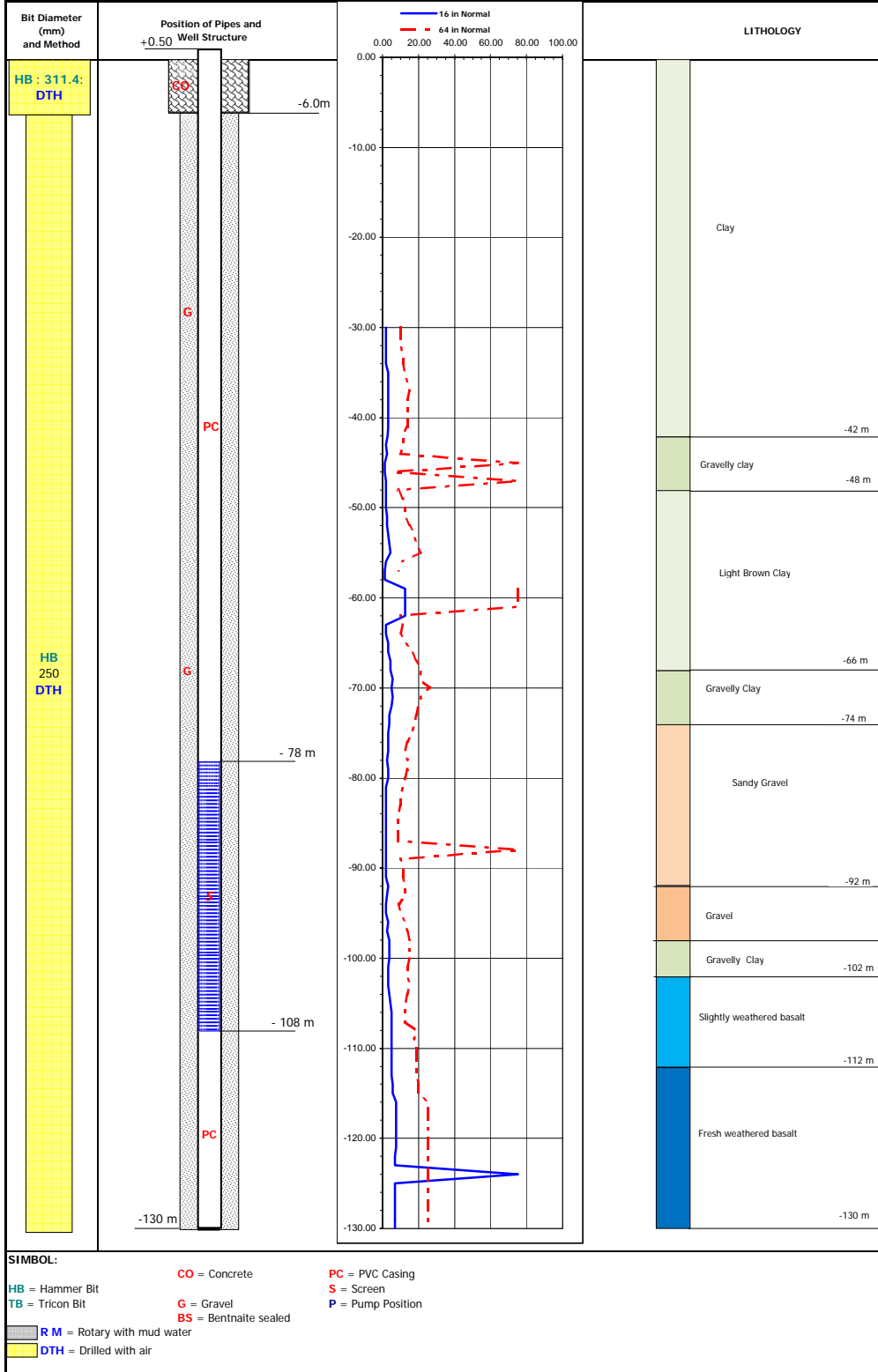


**SIMBOL:**

HB = Hammer Bit	CO = Concrete	PC = PVC Casing
TB = Tricon Bit	G = Gravel	S = Screen
	BS = Bentnaite sealed	P = Pump Position
	RM = Rotary with mud water	
	DTH = Drilled with air	

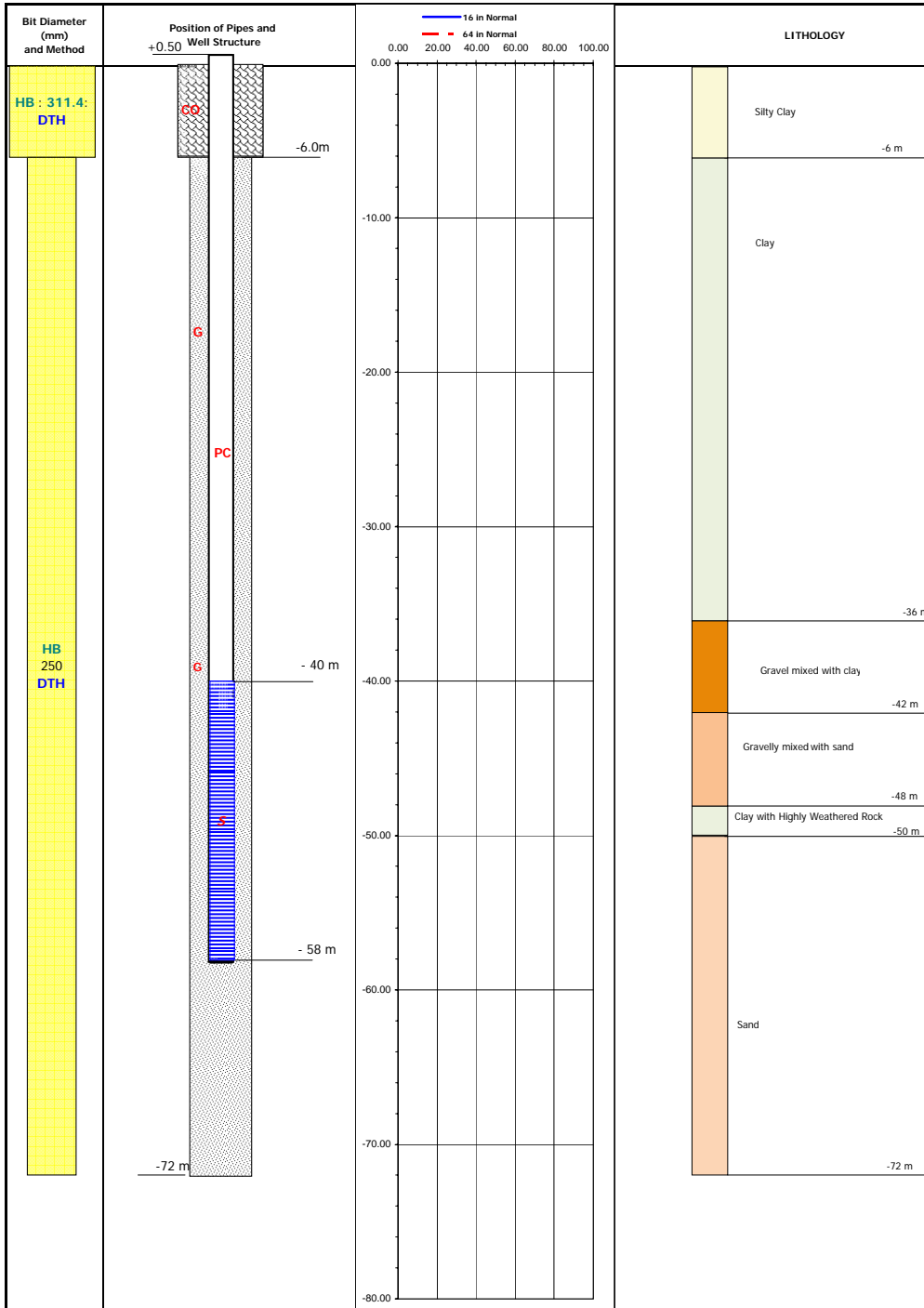
### Gemedadi Test Borehole

Well No. <i>JRA006</i>	Location <i>Gemedadi</i>	Coordinate (UTM) <i>567198</i>	Altitude <i>1,679 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>
Date: from <i>Jan. 29, 2007</i> to <i>Feb. 5, 2007</i>	Drilling:	Equipment Type	Method <i>DTH</i>	Flow	Depth <i>-130</i>	Depth	Final Depth <i>-130</i>
Casing Type : <i>PVC</i>	Type <i>6"</i>	Inside Dia. <i>150.0mm</i>	Outside Dia. <i>165.0mm</i>	Joint Type <i>Screw-welding</i>	Installation depth: <i>+0.5 -78;</i>	<i>-108 - 130;</i>	Total Length <i>100.0m</i>
Screen Pipe : <i>PVC</i>	Material	Diameter <i>150.0mm</i>	Silot Size <i>1.0mm</i>	Open Rate <i>10%</i>	Joint Type <i>Screw</i>	Installation depth: <i>-78 - 108;</i>	Total Length <i>30.0m</i>
Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
Gravel Packing	Origin	Gravel Size <i>ø 6-9mm</i>	Location	Volume	Development : <i>GL -49.7m</i>	Static Water Level	Method Duration Discharge
Submersible pump :	Installation Date : <i>not installed</i>						



### Tachgubegala Test Borehole

Well No. <i>JR4007</i>	Location <i>Tachgubegala</i>	Coordinate (UTM) <i>574788</i>	<i>1362533</i>	Altitude <i>1,391 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>
Date: from <i>Feb. 16, 2007</i> to <i>Feb. 18, 2007</i>	Drilling:	Equipment Type	Method <i>DTH</i>	Flow	Depth <i>-72</i>	Depth	Depth	Final Depth <i>-58</i>
Casing Type : <i>PVC</i>	Type <i>6"</i>	Inside Dia. <i>150.0mm</i>	Outside Dia. <i>165.0mm</i>	Joint Type <i>Screw+welding</i>	Installation depth: <i>+0.5 -40-</i>	Total Length <i>40.0m</i>		
Screen Pipe : <i>PVC</i>	Material	Diameter <i>150.0mm</i>	Silot Size <i>1.0mm</i>	Open Rate <i>10%</i>	Joint Type <i>Screw</i>	Installation depth: <i>-40 -58-</i>	Total Length <i>18.0m</i>	
Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length	
Gravel Packing	Origin	Gravel Size <i>ø 6-9mm</i>	Location	Volume	Development : <i>GL -18.1m</i>	Method	Duration	Discharge
Submersible pump :		Installation Date : not installed						

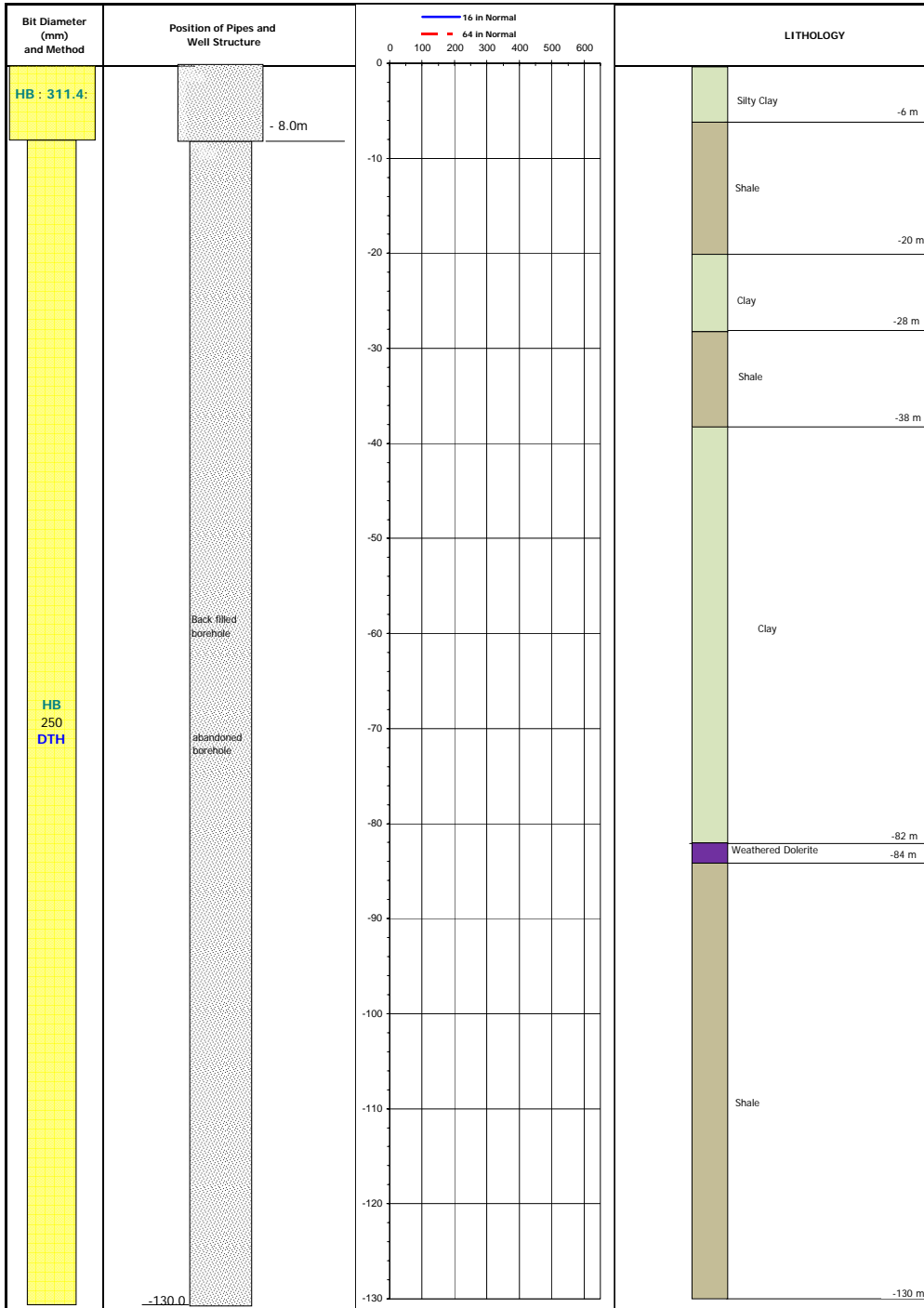


**SIMBOL:**

HB = Hammer Bit	CO = Concrete	PC = PVC Casing
TB = Tricon Bit	G = Gravel	S = Screen
RM = Rotary with mud water	BS = Bentnaite sealed	P = Pump Position
DTH = Drilled with air		

### Dengolat Test Borehole (Dry Well)

Well No. <i>JHW001</i>	Location <i>Dengolat</i>	Coordinate (UTM) <i>535230 1469777</i>	Altitude <i>2,036 m</i>	Town	Wareda	State <i>Tigray</i>	Cuntry <i>Ethiopia</i>	
Date: from <i>Feb. 19, 2007</i> to <i>Feb. 20, 2007</i>		Drilling: Equipment Type		Method <i>DTH</i>	Flow	Depth	Depth	Final Depth <i>-130</i>
Casing Type: Type		Inside Dia.	Outside Dia.	Joint Type	Installation depth: <i>Dry well</i>		Total Length	
Screen Pipe: Material		Diameter	Silot Size	Open Rate	Joint Type	Installation depth:		Total Length
Observation Pipe: <i>CS Pipe</i>		Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	
Gravel Pakking		Origin	Gravel Size	Location	Volume	Development: Static Water Level		Method
Submersible pump:		Installation Date: <i>not installed</i>						



**SIMBOL:**

<b>HB</b> = Hammer Bit	<b>CO</b> = Concrete	<b>PC</b> = PVC Casing
<b>TB</b> = Tricon Bit	<b>G</b> = Grabel Pacing	<b>S</b> = Screen
<b>RM</b> = Rotary with mud water	<b>BS</b> = Bentnaite sealed	<b>P</b> = Pump Position
<b>DTH</b> = Drilled with air		

#### (4) 社会経済調査結果

##### 社会経済調査（現地再委託）

###### (1) 目的

社会経済調査は、先方政府から要請のあった対象村落において、社会経済状況把握のための調査を実施し、事業実施のための優先村落選定、維持管理計画策定および計画全体の効果測定のための基礎データの収集と解析を行う。

###### 対象村落

対象村落は、先方政府から要請のあった約200村落を対象に実施した。要請書には同一村落において複数の計画地点が含まれていたため、調査地点数（集落数）は234か所となった。

表 1 郡別調査対象村落および集落数

郡(Woreda)	村落数	深井戸 対象集落 (Level-2)	浅井戸 対象集落 (Level-1)	リハビリ 対象集落	合計集落
Alamata	22	5	20	0	25
Raya Azebo	34	11	9	17	37
Enderta	30	0	33	0	33
Hintalo Wajirat	17	1	21	0	22
Kilte Awlaelo	13	0	20	0	20
Degua Temben	19	0	20	0	20
Kola Temben	17	0	20	0	20
Hawzen	17	0	19	0	19
Tnqua Abergele	16	0	18	0	18
Seharti Samre	12	0	20	0	20
合計	197	17	200	17	234

###### (2) 調査内容

調査内容は、（イ）200村落を対象とする村落概況調査、（ロ）村落位置情報データ収集、（ハ）サンプル家庭調査、（ニ）データ入力作業、および（ホ）報告書作成、となっている。調査内容の概要は下表に示すとおりである。

表 2 社会経済調査概要

項目	数量	調査手法・内容
1. 村落調査	197 村落 (234 集落)	質問票による村落幹部（村長、村長代理、水管理委員会メンバー、教師等）へのインタビュー調査によって村落の社会経済状況を把握する
2. 村の位置情報測定	197 村落 (234 集落)	GPS を使用して対象村落の位置情報を測定する
3. サンプル家庭調査	約 80 世帯 (16 村落)	<ul style="list-style-type: none"><li>質問票を使用したサンプル世帯の世帯主またはその配偶者へのインタビュー調査を通じて水使用状況、家計などを把握する。</li><li>サンプル世帯は高所得、中所得、</li></ul>

		低所得の各層から選定する
4. データ入力作業	村落データ、位置情報データ、サンプル家庭調査データの入力	収集したデータを Excel 表にまとめる
5. 報告書作成	1. Inception Report 2. Progress Report 3. Draft Final Report 4. Final Report	報告書には作業計画案、調査行程、Excel 表、調査結果、所見を含める。

### (3) 調査結果概要

#### 1) 調査対象村落数および集落数

要請リストには行政村 (Tabia)、村落 (Kushet)、集落 (Gote) 別の名前が記載されていたが、これらの名前にはいくつかの間違い、あるいは重複のあることが判明した。例えば、同じ村落名が深井戸対象村落と浅井戸対象村落に重複して記載されている例 (Bedenaleko村、Bubie村等)、同じ村落が異なる名前で記載されている例 (Denbaanae村とMaiwenyi村) などが見られた。これらの重複した村落を整理した結果、最終的なサイト数は194サイトとなった。

#### 2) 村落政府と給水事業

村落レベルの行政組織は住民によって選ばれた代議員によって運営されている。行政村 (Tabia) には評議会の下に役員会が設置され、その下に開発委員会その他の委員会が置かれている。行政村はいくつかの村落 (Kushet) からなっており、それらの村落にも同様の委員会が置かれている。村落給水委員会はこれら委員会のひとつとして位置づけられる。

#### 3) 村落給水委員会

調査対象村落のうち127村落に村落給水委員会 (VWC) が設立されている。これらの委員会は1964年から2006年の間に政府機関あるいはNGOなどの支援の下に設立されたものである。委員会の目的は給水施設の管理、水料金の徴収、維持管理活動などであるが、最近はこれらに加えて保健衛生活動も行われるようになっており、委員会の名前もWATSAN (水供給・保健衛生委員会) と呼ばれるようになっている。委員会のメンバーは通常3名から6名となっている。

#### 4) 主要水源と消費水量

対象村落における主要水源は雨期、乾期ともに伝統水源 (池、河川、湧水など) である。人力ポンプや管路給水施設などの既存給水施設を利用している村落は雨期に58村落、乾期に65村落となっている。しかしながら、これらの給水施設が無い、または利用できない村落数は56%を占めている。これらの村落では池、湧水、小河川などの伝統水源を利用している。また、既存施設のある村落においても、住民全体に供給できる体制に無いため、必要な生活用水の一部は伝統水源に依存している。

対象村落における一人当たり平均水消費量は10~15リットルである。10リットル未満の村落が28%、10~20リットルの村落が57%、20リットル以上の村は15%となっている。

表 3 対象村落における主要水源

郡	対象村落・サイト	雨期の主要水源				乾期の主要水源			
		伝統水源	人力ポンプ	管路給水	その他	伝統水源	人力ポンプ	管路給水	その他
Alamata	22	8	6	1	7	7	7	1	7
Raya Azebo	30	15	2	1	12	10	5	1	14
Enderta	24	13	8	0	3	11	10	0	3

Hintalo Wajirat	14	3	10	0	1	3	10	0	1
Kilte Awlaelo	19	13	6	0	0	13	6	0	0
Degua Temben	19	14	2	2	0	12	3	2	2
Kola Temben	19	15	4	0	0	15	4	0	0
Hawzen	19	12	7	0	0	12	7	0	0
Tanqua Abergele	16	10	6	0	0	10	6	0	0
Seharti Samre	12	6	3	0	3	6	3	0	3
合計	194	109	54	4	26	99	61	4	30

註：その他には他村からの給水、買水などが含まれる。

#### 5) 水料金の支払い意思

対象村落における水料金の徴収は給水地点でポリ容器（20～25リットル容量が多い）当りの金額で行われるケースが多い。容器当り5セントないし10セントで徴収されているが、10セントが通常の価格である。

水料金の支払い意思額も容器当り10セントとの回答が最も多く、次いで5セントであり、最後に20セント以上の回答であった。

#### 6) 支払い能力

支払い能力は平均月額家計所得の5%を基準に算定した。月額10Birr未満の村落が23%、10～20Birrの村落が最も多く41%、また、20Birr以上の村落が27%であった。

容器当り10セントの水料金は、月額に換算するとおよそ10Birrである<sup>1</sup>（家族数などによって異なる）。対象村落の大部分（67%）の村落では容器当り10セント以上の支払い能力があるということになる。

<sup>1</sup> 月額7Birrから12Birrに相当する

# (5) リハビリサイトの調査結果

リハビリサイトの調査結果総括表

No.	名称	所在地	建設年	建設資金の 出資金元	機能状況 機能(F) /機能し ていない (NF)	問題点 問題点 停止時期	機軸 機軸 停止時期	リハビリ 時期	リハビリ 期間	一般情報			水源				ポンプ				配水池				運転維持管理						
										UTM E (m)	UTM N (m)	地盤高 (m)	代表水源	BH深度 (m)	BH能力 (L/s)	BHケー シング径 (インチ)	ポンプ 能力 (L/s)	ポンプと エンジン メーカー 43	駆動 ポンプ 能力 (L/s)	配水池に 満たす 時間 (min)	簡出能力 の有無	配水池 容量 (m3)	管線 延長 (m)	水委員会 スタッフ数	一日あた りの配 水時間	公営給 水の 開始時 間	一日あた りの配 水の回 数	月間運 転コスト (円)	月間運 転コスト (円)	日当 りの配 水時間 (分)	ポンプ 稼働 時間 (時間)
1	オオタカ	235 585463	1399546	1.558	1996	ESRDF	F	5,891.13	5		ボンド	90	1	6	2.3	リース	1.3	40	N.A.	3.2	200		3	5	7	200	2,200	500	0.1	なし	
2	アデアレ	120 580822	1402081	1.528	1996	TWRMB	F	5.69	2		ボンド	N.A.	2	8	2.3	モリスター	2.7	20	N.A.	3.2	50		3	N.A.	8	400	N.A.	80	0.1	なし	
3	シロカ	276 585959	1406081	1.546	1996	TWRMB	F	4,789.13	4		ボンド	140	2	6	2.3	モリスター	2.7	25	N.A.	4	70		5	7	11	200	1,200	80	0.1	なし	
4	フジ	200 569585	1401152	1.645	1979	中央政府	NF	57,910.1	2004		ボンド	93	N.A.	8	2.3	モリスター	2.2	90	A (500m)	12	50		0	N.A.	N.A.	N.A.	N.A.	N.A.	0.1	なし	
5	ツエダガ	354 574717	1392628	1.523	1979	中央政府	F	7	4	2004	他の施設	N.A.	2	6	2.3	モリスター	2.8	60	N.A.	10	50		3	8	9	N.A.	3,600	400	0.1	なし	
6	ペルカリナ	315 508335	1391864	1.623	1999	ESRDF	F	78,910.1	5	2006	ボンドと他の施設	110	2	6	2.3	モリスター	1.8	30	N.A.	3.2	70		3	8	11	400	N.A.	400	0.1	なし	
7	ハダシエ	445 575300	1370108	1.428	2001	オーソドックス 教会	F	5,78.9	4	2005	ボンドと 他の施設	102	7	6	2.3	モリスター	2.1	25	N.A.	3.2	1,000		5	8	11	700	2,000	1,200	0.1	なし	
8	ペンダ	200 573007	1373114	1.402	1979	中央政府	F	7.8.9			ボンド	200	2	6	2.3	モリスター	1.8	30	N.A.	3.2	50		5	5	10	400	1,100	170	0.1	なし	
9	ケバ	600 574149	1405439	1.625	1996	オーソドックス 教会	F	8	1		ボンド	140	7	6	4.0	モリスター	3.3	20	N.A.	4	50		5	8	10	350	1,700	250	0.1	なし	
10	チエト	140 583187	1399654	1.531	2001	オーソドックス 教会	F	59,13.14	4	2007	ボンド	99	3	6	3.0	モリスター	2.7	20	N.A.	3.2	100		5	9	11	350	1,900	120	0.1	あり	
11	アデアレ	139 577549	1396839	1.510	2002	オーソドックス 教会	NF	7			ボンド	120	6.5	6	N.A.	水中ポン プとCGM	5.6	30	N.A.	10	50		4	N.A.	N.A.	300	N.A.	N.A.	0.1	なし	
12	アデアレ	250 578404	1387098	1.523	2002	オーソドックス 教会	NF	1.7.13			ボンド	75	2	6	2.0	水切ポン プとCGM	1.4	120	N.A.	10	600		5	10	11	400	4,000	N.A.	0.1	なし	
13	カタマ	N.A. 568677	1416533	1.813	1999	オーソドックス 教会	NF	9,10.13.14		2007	ボンド	N.A.	1.5	6	7.0	アルシ とCGM	3.5	240	N.A.	50	200		0	N.A.	N.A.	N.A.	N.A.	N.A.	0.1	なし	
14	カタマ	226 567976	1410406	1.774	1996	オーソドックス 教会	F	5,7.8.9	3		ボンド	70	2	6	6.7	モリスター	5.3	10	N.A.	3.2	70		5	0.3	7	270	370	70	0.1	なし	
15	フェチャガマ	210 577652	1402599	1.559	1979	中央政府	F	5	5	1996	ボンド	100	N.A.	6	2.3	モリスター	3.1	45	N.A.	8.5	50		3	5-6	8	200	2,400	1,000	0.1	あり	
16	チエト	243 576586	1406683	1.600	1992	TWRMB	F	5	5		ボンド	N.A.	2	6	2.3	モリスター	1.3	60	A (500m)	4.8	70		4	9	10	N.A.	1,300	800	0.1	あり	
17	ワルグバ	350 574112	1410871	1.661	1979	TWRMB	NF	2007	5	2	1996	ボンドと 他の施設	N.A.	7	8	2.3	モリスター	2.2	90	A (500m)	12	30		3	8	11	300	1,500	500	0.1	あり

## 以下の条件に該当するサイトはリハビリ対象としな

- A. : タウン水道によってサービスを受けているため、除外された。
- B. : 水質や水量が問題ない。
- C. : 他のオプションボトル施設の利用が可能である。
- D. : 2000年以降、リハビリが実施され、現在機能している。
- E. : 水質やポンプに係る情報が不足している。

## \*1 建設資金の出資元

- ESRDF: エチオピア社会リハビリ開発基金
- TWRMB: テラジラ州水資源・嵐山・エネルギー局

## \*2 障害施設の問題点:

1. ポンプホールの枯渇
2. 揚水不足
3. ポンプホールの崩壊
4. 水質問題
5. ポンプの損傷
6. ポンプの能力不足
7. 発電機やエンジンの損傷
8. 配水池容量の不足
9. 配水池の劣化及び漏水
10. 管路損傷
11. 管路劣化(サビ)
12. 管線不足
13. 公共水柱の損傷
14. その他

## \*3 ポンプとエンジンメーカー

- モリスター
- リースター
- リスター
- リスター



(6) 井戸掘削対象集落一覧

I. レベル1井戸掘削対象集落一覧

No.	PJ ID	郡 (ワレダ)	タピア	村落 (クシエット)	集落 (ゴテ)	位置座標			受益者数 (2006年) (要請書)	地下水ポテンシャル評価			掘削方法	想定 掘削深度 (m)	設定 成功率 (%)
						UTM E (m)	UTM N (m)	Level (m)		水量	水位	水質			
1	JAL007	Alamata	Timuga	Kunkura	Maedo Ketema	565499	1357078	1437	428	4	4	4	DMCD	100	77
2	JAL010	Alamata	Selenwuha	Kubiderba	Amgedel	570738	1365109	1407	299	4	4	4	DMCD	100	77
3	JAL011	Alamata	Selenwuha	Gedera	Gedera	568138	1363597	1569	671	4	4	4	DMCD	100	77
4	JAL012	Alamata	Weselenwuha (Limat)	Adi haqos tsegay	Endasilasie(Adihana)	567594	1367414	1460	323	4	4	4	DMCD	100	77
5	JAL013	Alamata	Limat	Adiabogaja	Sifraamora	561298	1364409	1538	300	3	4	4	DMCD	100	77
6	JAL014	Alamata	Limat	Hashiamariam	Hashiamariam	558766	1370039	1439	420	3	4	4	DMCD	100	77
7	JAL015	Alamata	Selam bikalsi	Rarhe	Rarhe	561506	1370065	1524	819	4	4	4	DMCD	100	77
8	JAL017	Alamata	Selam bikalsi	Adimohoye	Adimohoye	565809	1371093	-	900	4	4	4	DMCD	100	77
9	JAL018	Alamata	Selam bikalsi	Hadis Kigni	Hadis Kigni	566890	1372156	1580	308	4	4	4	DMCD	100	77
10	JAL019	Alamata	Kululemlem	Adishiashim	Adishiashim	565230	1378203	1482	520	3	4	4	DMCD	100	77
11	JAL020	Alamata	Kuigize Zemlem	Agamitie	Agamitie	566941	1376821	1463	461	3	4	4	DMCD	100	77
12	JAL022	Alamata	Tao	Adihantia	Adihantia	568277	1380792	1453	429	4	4	4	DMCD	100	77
13	JAL023	Alamata	Waja ketema	Waja ketema	Waja ketema	565335	1357958	1452	358	4	4	4	DMCD	100	77
14	JAL024	Alamata	Selenwuha	Harle	Harle school	565270	1363686	1467	488	4	4	4	DMCD	100	77
15	JAL025	Alamata	Limat	Adleshok	Alambirhan school	564126	1365675	1480	502	4	4	4	DMCD	100	77
16	JED027	Enderta	Arato	Endarbashelema	Endarbashelema	563361	1495252	2341	760	4	4	4	DMCD	80	77
17	JRA012	Raya Azebo	Bala Ulga	Butamiréta	Buta	585379	1372176	1677	1,000	4	4	4	DMCD	100	77
18	JRA013	Raya Azebo	Bala Ulga	Ulaga	Bisebir	587904	1375284	1604	900	4	4	4	DMCD	100	77
19	JHW010	Hawzen	Meztey	Dabaseria	-	551969	1554971	2300	550	3	3	3	DMCD	60	66
20	JED001	Enderta	Maianbessa	Maialmer	Around school	544778	1492826	2122	800	3	3	3	DTH	90	77
21	JED003	Enderta	Maianbessa	Maiewyni	Malayni	541577	1491125	2180	900	3	4	4	DTH	60	77
22	JED005	Enderta	Maialem	Mishim	Mishim	543600	1495723	2016	1,300	3	3	3	DTH	90	77
23	JED006	Enderta	Maialem	Zibanhided	Zibanhided	545913	1496414	2059	600	3	4	3	DTH	90	77
24	JED008	Enderta	Debri	Mekaih	Kokahi	545491	1488261	2094	600	3	4	3	DTH	80	77
25	JED009	Enderta	Debri	Adiamik	Adiamik	544481	1499644	2127	795	3	4	3	DTH	80	77
26	JED015	Enderta	Mariam dehan	Adikolkal	Adikolkus	551959	1496500	1982	570	4	4	3	DTH	60	77
27	JED019	Enderta	Cheleket	Maekelgeza	Akeb demamu	550671	1478038	2016	800	4	4	4	DTH	130	77
28	JED024	Enderta	Shibta	Randa	Randa	556070	1486658	2226	600	3	4	4	DTH	100	77
29	JED025	Enderta	Shibta	Egrwember	Egrwember	555920	1491495	2238	890	3	3	3	DTH	80	77
30	JED026	Enderta	Arato	Dean	Dean	567399	1492349	-	960	3	4	3	DTH	80	77
31	JED032	Enderta	Lemlem	Lahama	Lahama	572860	1481986	-	790	4	4	4	DTH	100	77
32	JED033	Enderta	Lemlem	Lemlem	Akeza	572574	1485081	2473	800	3	4	3	DTH	70	77
33	JKA001	Kilte Awiaelo	Mai quiha	Maidaero	Kembirto	554330	1525856	2102	680	4	3	4	DTH	100	77
34	JKA003	Kilte Awiaelo	Debretsison	Debremear	Gelebet	546070	1528527	2104	300	4	3	4	DTH	100	77
35	JKA004	Kilte Awiaelo	Debretsison	Debremear	Debremear	543903	1530533	2021	500	4	3	4	DTH	100	77
36	JKA009	Kilte Awiaelo	Gemedede	Tsahilo	Kokay	561369	1526922	-	600	3	4	4	DTH	100	77
37	JKA012	Kilte Awiaelo	Awolo	Awolo	Ziban adi	549998	1520609	2081	395	4	3	4	DTH	100	77
38	JKA015	Kilte Awiaelo	Myweini	Sherafo	Around church	560804	1513410	1980	400	4	4	3	DTH	150	77
39	JKA016	Kilte Awiaelo	Ganfelf	Denggolo	Adiarbea	562457	1524940	2001	600	3	4	4	DTH	100	77
40	JDT003	Degua Temben	Siret	Endamariam	Endamariam	512908	1501556	2624	370	4	4	4	DTH	60	66
41	JDT011	Degua Temben	Selam	Adiwerho	Adiwerho	521155	1511001	2216	320	4	4	3	DTH	100	66
42	JDT012	Degua Temben	A Kekn	Alasa	Alasa	529257	1512874	2415	310	4	4	3	DTH	150	66
43	JDT013	Degua Temben	A Kekn	Raset	Raset	527934	1510859	2433	350	4	4	3	DTH	150	66
44	JHW005	Hintalo Wajirat	Fikre Selam	Aderak	Mai slas	552401	1456945	2235	500	4	3	3	DTH	150	77
45	JHW011	Hintalo Wajirat	Senale	Senale	Maikokho	576299	1444609	2345	521	3	4	4	DTH	60	77
46	JHW012	Hintalo Wajirat	Senale	Genti	Maidimu	544845	1442355	2401	400	3	4	4	DTH	60	77
47	JHW013	Hintalo Wajirat	Hareko	Harego	Adikiffom	538705	1461990	2083	300	3	3	4	DTH	130	77
48	JHW021	Hintalo Wajirat	Matkei	Messeret	Netae	536194	1480072	-	300	3	4	4	DTH	60	77

No.	PJ ID	郡 (フレダ)	タピア	村落 (クシエット)	集落 (ゴテ)	位置座標			受益者数 (2006年) (要請書)	地下水ポテンシャル評価			掘削方法	想定 掘削深度 (m)	設定 成功率 (%)
						UTM E (m)	UTM N (m)	Level (m)		水量	水位	水質			
49	JKA017	Kilte Awiaelo	Abreha atsihiba	Selam	Adikulala	556980	1532494	2016	320	3	4	4	DTH	100	77
50	JKA018	Kilte Awiaelo	Abreha atsihiba	Selam	Maichew	554153	1531491	1982	360	4	4	4	DTH	60	77
51	JKA019	Kilte Awiaelo	Abreha atsihiba	Mindae	Eklil	554277	1528503	-	500	4	4	4	DTH	80	77
52	JDT001	Degua Temben	Maniberesilase	Maseva	Maseva	4510203	1510203	2363	350	4	4	4	DTH	100	66
53	JDT004	Degua Temben	Siret	Mahibere Shih	Mahiberesnih	518912	1503075	2601	250	4	4	4	DTH	100	66
54	JDT018	Degua Temben	Arebay	Arebay	Arebay	528850	1516704	2631	350	4	4	4	DTH	60	66
55	JDT019	Degua Temben	Arebay	Keikelle	Keikelle	528298	1518859	2442	350	3	3	4	DTH	150	66
56	JKT001	Kola Temben	Merere	Chimate	Tsekenite	481757	1512498	1946	250	3	4	4	DTH	60	66
57	JKT003	Kola Temben	Merere	Guroro	Azeve	482194	1513216	-	250	3	4	4	DTH	60	66
58	JKT005	Kola Temben	Santa gelebede	Betro	Ater	522688	1529592	-	450	3	4	4	DTH	60	66
59	JKT008	Kola Temben	Getsiki melsley	Endamariam	Sheka	500819	1511288	1892	240	3	4	4	DTH	100	66
60	JKT009	Kola Temben	Getsiki melsley	Sataya	Wersege	502078	1516122	1844	440	3	4	4	DTH	60	66
61	JKT012	Kola Temben	Simet	Adichelo	Tsanni	487713	1505773	1952	215	3	4	4	DTH	60	66
62	JKT013	Kola Temben	Adiha	Siken	Tahitay Siken	508235	1520534	1733	265	3	4	4	DTH	60	66
63	JKT014	Kola Temben	Workemba	Etanzore	Guzara	504722	1519589	1831	240	3	4	4	DTH	60	66
64	JKT017	Kola Temben	Shilumenni	Tsiwatsiwa	Tsewenya	476452	1503176	1691	315	3	4	4	DTH	60	66
65	JTA002	Tanqua Abergele	Lem'at	Adimiale	Adimiale	497890	1501437	1743	1,200	4	4	4	DTH	80	66
66	JTA005	Tanqua Abergele	Felegehiwot	Gufitarme	Gufitarme	483706	1468478	1228	520	3	4	4	DTH	80	66
67	JTA006	Tanqua Abergele	Felegehiwot	Erezna	Erezna	489234	1467954	1298	460	3	4	4	DTH	80	66
68	JTA007	Tanqua Abergele	Siye	Hidmo(1)	Hidmo(1)	483988	1485953	1446	600	3	4	4	DTH	80	66
69	JTA008	Tanqua Abergele	Siye	Hidmo(2)	Hidmo(2)	481790	1483764	1501	400	3	4	4	DTH	80	66
70	JTA009	Tanqua Abergele	Siye	Gomenge	Gomenge	478933	1481800	1445	510	3	4	4	DTH	80	66
71	JTA011	Tanqua Abergele	Siye	Teklemkenira	Teklemkenira	483763	1477320	1277	600	4	4	4	DTH	80	66
72	JTA012	Tanqua Abergele	Siye	Metere	Metere	487775	1482782	1385	500	3	4	4	DTH	80	66
73	JTA018	Tanqua Abergele	Jijique	Jijique	Jijique	484252	1489519	1724	360	4	4	4	DTH	60	66
74	JSS002	Seharti Samre	Neber Hadne	Fenarawa	Wate Kezena	503924	1447967	1493	175	3	4	4	DTH	60	66
75	JSS008	Seharti Samre	Lemlem Aren	Seberye	Tahitay Seberia	527869	1451647	1693	250	4	4	4	DTH	60	66
76	JSS009	Seharti Samre	May Tekli	Terezeba	Bereziaba	-	-	2007	190	3	4	3	DTH	60	66
77	JSS013	Seharti Samre	Bamba	Bamba	Harawa	507913	1482311	1611	180	3	4	4	DTH	60	66
78	JHW001	Hawzen	Adibelow	Mererhuwa	-	531679	1541602	1915	700	3	2	3	DTH	120	66
79	JHW003	Hawzen	Baleda	Adigeleah	-	539525	1553409	1913	500	3	2	3	DTH	150	66
80	JHW005	Hawzen	Debrebizen	Setet	-	541404	1560528	2107	410	3	2	3	DTH	100	66
81	JHW007	Hawzen	Debreselam	Berakit	-	535172	1540214	1916	500	3	4	3	DTH	120	66
82	JHW015	Hawzen	Degamba	Degamba	-	550791	1557153	2380	500	3	3	3	DTH	80	66
83	JHW016	Hawzen	Degamba	Shikut	-	550654	1559471	2345	400	4	3	4	DTH	100	66
84	JHW017	Hawzen	Debrehiwot	Awadu	-	541745	1543912	2080	550	3	3	2	DTH	130	66
85	JHW019	Hawzen	Debrehawaz	Siluh	-	546628	1548447	2231	490	3	3	4	DTH	60	66

II. レベル2井戸掘削対象集落一覧

No.	PJ ID	郡 (フレダ)	タピア	村落 (クシエット)	集落 (ゴテ)	位置座標			受益者数 (2006年) (要請書)	地下水ポテンシャル評価			掘削方法	想定 掘削深度 (m)	設定 成功率 (%)
						UTM E (m)	UTM N (m)	Level (m)		水量	水位	水質			
86	JAL002	Alamata	Selenwuha	Bedena leko	Bedena leko	578893	1361615	1391	2,240	4	4	4	DMCD	130	100
87	JRA001	Rava Azebo	Hadealga	Hadealga	Hadealga	583329	1395187	-	2,000	4	4	4	DMCD	135	100
88	JRA002	Rava Azebo	Hawlii	Hirka	Hirka	575382	1418205	1734	1,500	2	2	4	DMCD	82	100
89	JRA006	Rava Azebo	Werabay	Gendialjo	Gamed dadi	567503	1400076	1671	1,035	4	2	4	DMCD	130	100

凡例:

- \* 地下水ポテンシャル評価
- 水量: 4:豊富, 3:普通, 2:少ない, 1:乏しい
- 水位: 4:45m未満, 3:80m未満, 2:不特定, 1:80mより深い
- 水質: 4:良い, 3:普通, 2:やや乏しい, 1:悪い

\* 井戸構造タイプ: 本文中の図3. 1. 3. 2に対応

\* 掘削方法

DTH: タウンガホールンマー  
DMCD: 泥水循環式掘削工法

(7) 維持管理費算定結果

表-1 新規レベル2施設の運営維持管理費と水価

1. サイト毎の水価

排水口 排水口 排水口	給水対象区域	単位	出典/計算式	No.1		No.2		No.3		No.4		No.5		No.6		No.7		No.8		No.9		No.10			
				アラマタ		アラマタ		アラマタ		アラマタ		アラマタ		アラマタ		アラマタ		アラマタ		アラマタ		アラマタ		アラマタ	
				レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2	レベル2
A1	2006年給水人口(現況)	人	要請リスト	2,240	4,100	2,150	3,000	3,000	1,580	2,000	3,000	1,750	1,250	1,750	1,685	1,035	1,135								
A2	2015年給水人口(目標年次)	人	人口増加率:2.23%	2,732	5,000	2,622	3,659	3,659	1,829	2,439	3,659	1,927	1,524	2,134	2,055	1,262	1,384								
A3	一世帯当たりの平均家族数(現況:2006年)	人	社会経済調査	3.7	6.3	4.1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.9	6.0	5.0	5.0								
A4	2015年推定世帯数	世帯	A2÷A3	738	794	640	732	732	366	488	732	385	305	309	343	252	277								
B	電力形態		本調査施設計画	発電機	商用電力	発電機	商用電力	商用電力		商用電力	商用電力	商用電力	商用電力	商用電力	商用電力	商用電力	商用電力								
C1	発電機出力	KVA	本調査施設計画	25	-	37	-	-	-	-	-	-	17	25	15	11	11								
C2	運転時間	hr	本調査施設計画	7	7	7	7	7	7	7	7	9	9	13	7	7	7								
D	発電機燃料消費量	L/日	本調査施設計画	24	-	36	-	-	-	-	-	-	21	19	24	15	10								
E	動力ポンプ使用電力量	KWh	本調査施設計画	-	9.2	-	7.5	7.5	1,103	3,234	1,103	3,497	-	-	-	-	-								
F	月額商用電力代	Birr/月	0.7(Birr)XEGX2X30日	-	1,352	-	1,103	1,103	6,480	970.2	330.8	1,049	1,134	1,026	1,296	810	540								
G	月額発電機燃料代金	Birr/月	D x 6(Birr/張代) X 30日	4,320	-	6,480	-	-	-	4,204	1,433	4,545	4,914	4,446	5,616	3,510	2,340								
H	人件費+機材消耗品+交換費+備品	Birr/月	G X 0.3	1,296	406	1,944	330.8	330.8	1,944	4,204	1,433	4,545	4,914	4,446	5,616	3,510	2,340								
I	月額維持管理費合計(概算)	Birr/集落	F+H, G+H	5,616	1,758	8,424	1,433	1,433	8,424	4,204	1,433	4,545	4,914	4,446	5,616	3,510	2,340								
J	日最大給水量	L/s	本調査施設計画	1.31	2.34	1.16	2.67	2.67	1.16	2.67	2.67	3.16	0.64	0.92	0.89	0.53	0.58								
K	日平均揚水量	m³/日	J X 60 X 24 / 1000	113	202	100	230	230	100	230	230	273	55	79	77	45	50								
L	月揚水量	m³/月	K X 30	3,401	6,060	3,004	6,908	6,908	3,004	6,908	6,908	8,183	1,646	2,385	2,312	1,363	1,483								
M	無効水量を除いた水量	m³/月	L ÷ 1.2 ÷ 1.2	2,362	4,208	2,086	4,797	4,797	2,086	4,797	4,797	5,683	1,143	1,656	1,606	947	1,037								
N	1m³当たりの原価	Birr/m³	I÷M	2.38	0.42	4.04	1.18	1.18	4.04	0.80	0.80	0.80	4.30	2.66	3.50	3.71	2.26								
O	ジェリ缶(20L)当たりの原価	Birr/缶	N÷50(個)	0.05	0.01	0.08	0.02	0.02	0.08	0.02	0.02	0.02	0.09	0.05	0.07	0.05	0.05								
P	現在のジェリ缶当たりの支払額	Birr/缶	社会経済調査	0.1~0.15	0.10	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15	0.1~0.15								

2. サイト別水料金支出予測

排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口
AA	一世帯当たりの月間水消費量	L/月/世帯	A3 X 30日 X 15L	1,665	2,835	1,845	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250
BB	一世帯当たりのジェリ缶の月間利用数	個/月/世帯	AA ÷ 20L	83.3	141.8	92.3	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
CC	集落毎の月間総ジェリ缶利用数	個/月/集落	A4 X BB	61,470	112,500	58,995	82,328	82,328	41,153	82,328	82,328	43,358	34,290	48,015	46,238	28,395	31,140						
DD	集落毎の水利用金額総計(0.10Birr/缶と設定した場合)	Birr/月/集落	0.1Birr X CC	6,147	11,250	5,900	8,233	8,233	4,115	8,233	8,233	4,336	3,429	4,802	4,624	2,840	3,114						
EE	集落毎の水利用金額総計(0.15Birr/缶と設定した場合)	Birr/月/集落	0.15Birr X CC	9,221	16,875	8,849	12,349	12,349	6,173	12,349	12,349	6,504	5,144	7,202	6,936	4,259	4,671						

3. サイト別支払い能力(社会経済調査結果)

排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	排水口	
FF	集落別 支払い可能額	Birr/月/集落	一世帯当たりの月間平均支払可能額(Birr) X A4	42,088	18,254	13,430	8,780	62,203	12,803	18,295	7,708	13,716	13,917	15,755	7,572	12,733								

A4: 一世帯当たりの平均家族数は現況(2006年)値を採用した  
D: 運転1時間あたり燃料消費率(発電機):0.173L/KWh 出典「建設工事標準歩掛」  
G: 燃料代は燃料の運搬料金も含めて算出した=6Birr  
H: 人件費+機材消費費+交通費+備品は概ね燃料費の30%を採用した  
F: 商用電力は時間あたりのKwh単価は過去の例をもとに0.7Birrと設定  
M: 有収水量=有効水量 ÷ 1.2 ÷ 1.2  
FF: 一世帯当たりの月間平均支払可能額は社会経済調査結果から設定した

(8) 運営維持管理用管理シート

Tigray Bureau of Water Resource Development

Workshop Unit - Job Card

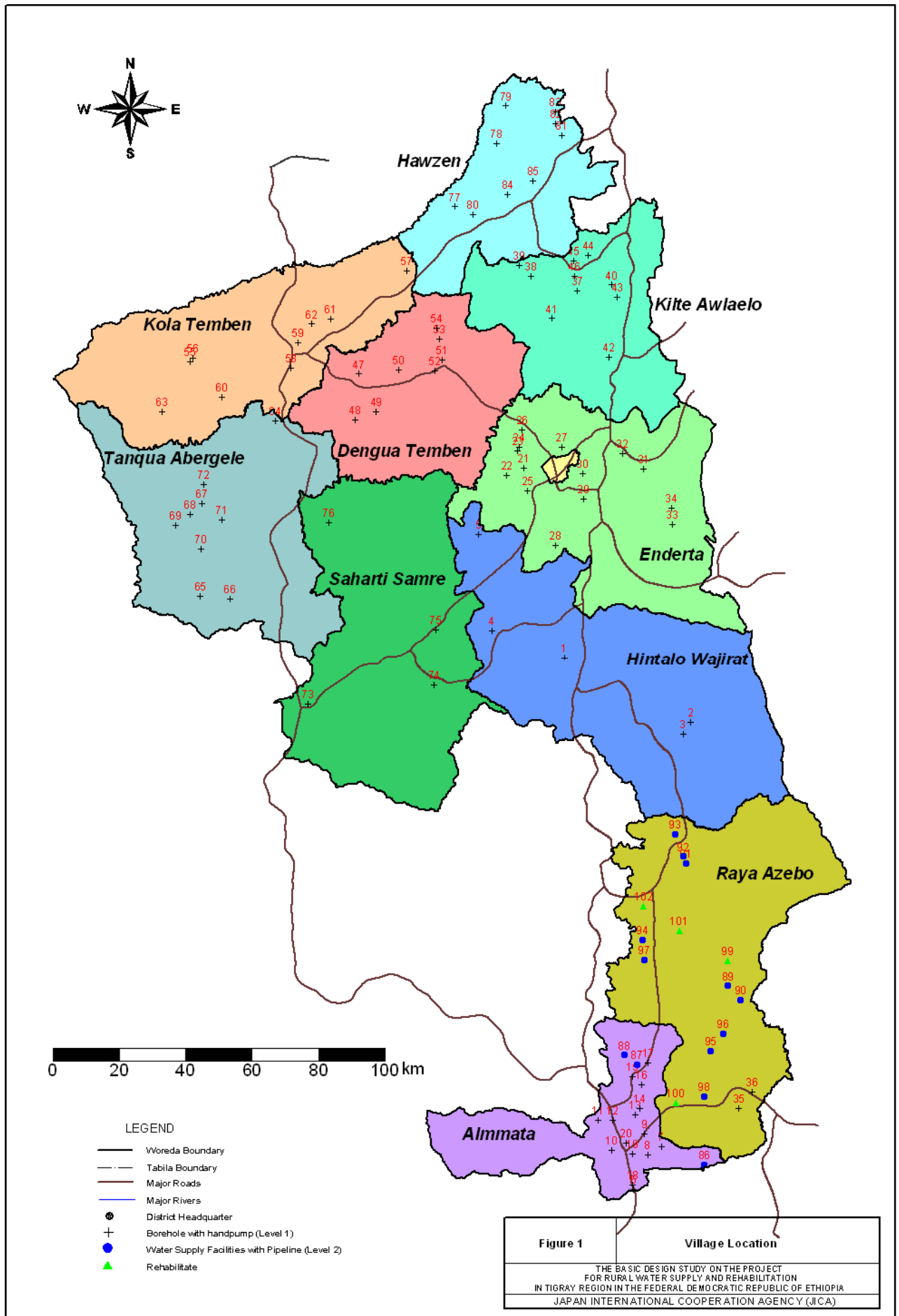
No. 0358

Station:				
Client:				
Services required:				
Equipment:	Manufacturer:	Model:	Serial no.:	Operation hours:
Estimated costs:				Birr
Spare parts	as required			
Consumables	as required			
Labour	as per standard time catalogue			
Workshop cost	10 % of net cost above			
Other costs	as per invoice			
Per diems	42 Birr/8 h - 70 Birr/24 h			
Transport	1 Birr/km or 50 Birr/hour			
Equipment used	Rehabilitation Rig, Truck 1 Birr/km or 50 Birr/hour			
Equipment rental	15 to 25 Birr/day, depend on equipment			
Total estimated price without 15 % Sales Tax				
Works to be performed:			Remarks:	
Approved to carry out the work, Date/Name/Signature Client: _____				
Time record of services provided:				
Date	Description			Hours
The job has been completed on: _____ to the satisfaction of the Client				
Date/Name/Signature Client _____				
Date/Name/Signature Station <i>W/C</i> _____ <i>U. Chan</i>				

Job Card, back page

Materials required/delivered					
No.	Description	No.	Date	Birr	
1					
2					
3					
Total					
Consumables required/delivered					
No.	Description	No.	Date	Birr	
4					
5					
6					
Total					
Staff who did the job					
No.	Name Position	Hours	Standard	Unit price	Birr
7					
8					
9					
10					
Total					
Workshop and other costs					
No.	Description				Birr
11	Workshop costs				
12	External costs				
13	Per diems				
14	Transport				
15	Equipment used				
16	Equipment rental				
Grand total					
Job certified out by: _____ on: _____					
Invoice raised on: _____ Invoice number: _____					

(9) 対象村落リスト



エチオピア国ティグライ州水供給整備・改修計画 対象村落一覧

No	ID No.	フレダ	タビア	クシェット	ゴテ	座標(UTM)			施設 タイプ
						X	Y	Z	
1	JHW005	Hintalo Wajirat	Fikre Selam	Aderak	Mai slas	552401	1456945	2235	レベル1
2	JHW011	Hintalo Wajirat	Senale	Senale	Maikokho	576299	1444609	2345	レベル1
3	JHW012	Hintalo Wajirat	Senale	Genti	Maidimu	574845	1442355	2401	レベル1
4	JHW013	Hintalo Wajirat	Hareko	Harego	Adikiflom	538705	1461990	2083	レベル1
5	JHW021	Hintalo Wajirat	Metkei	Meseret	Netae	536194	1480072	-	レベル1
6	JAL007	Alamata	Timuga	Kunkura	Maedo Ketema	565499	1357078	1437	レベル1
7	JAL010	Alamata	Selenwuha	Kubiderba	Amgedel	570738	1365109	1407	レベル1
8	JAL011	Alamata	Selenwuha	Gedera	Gedera	568138	1363597	1569	レベル1
9	JAL012	Alamata	Weselenwuha (Limat)	Adi hagos tsegay	Endasilasie(Adihana)	567594	1367414	1460	レベル1
10	JAL013	Alamata	Limat	Adiabogaja	Sifraamora	561298	1364409	1538	レベル1
11	JAL014	Alamata	Limat	Hashiamariam	Hashiamariam	558766	1370039	1439	レベル1
12	JAL015	Alamata	Selam bikalsi	Rarhe	Rarhe	561506	1370065	1524	レベル1
13	JAL017	Alamata	Selam bikalsi	Adimohoye	Adimohoye	565809	1371093	-	レベル1
14	JAL018	Alamata	Selam bikalsi	Hadis kigni	Hadis Kigni	566690	1372156	1580	レベル1
15	JAL019	Alamata	Kululemlem	Adishihashim	Adishihashim	565230	1378203	1482	レベル1
16	JAL020	Alamata	Kulugize Zemlem	Agamitie	Agamitie	566941	1376621	1463	レベル1
17	JAL022	Alamata	Tao	Adihantia	Adihantia	568277	1380792	1453	レベル1
18	JAL023	Alamata	Waja ketema	Waja ketema	Waja ketema	565335	1357958	1452	レベル1
19	JAL024	Alamata	Selenwuha	Harle	Harle school	565270	1363686	1467	レベル1
20	JAL025	Alamata	Limat	Adieshok	Alembirhan school	564126	1365675	1480	レベル1
21	JED001	Enderta	Maiabesa	Maiumer	Around school	544738	1492526	2122	レベル1
22	JED003	Enderta	Maiabesa	Maiweyni	Maiayni	541577	1491125	2180	レベル1
23	JED005	Enderta	Maialem	Mishim	Mishim	543600	1495723	2016	レベル1
24	JED008	Enderta	Maialem	Zibanided	Zibanhided	543913	1496414	2059	レベル1
25	JED008	Enderta	Debri	Mekaih	Kokahi	545491	1488261	2094	レベル1
26	JED009	Enderta	Debri	Adiamik	Adiamik	544481	1499644	2127	レベル1
27	JED015	Enderta	Mariam dehan	Adikolkal	Adikolkus	551959	1496500	1982	レベル1
28	JED019	Enderta	Cheleket	Maekelegeza	Akeb demamu	550671	1478038	2016	レベル1
29	JED024	Enderta	Shibta	Randa	Randa	556070	1486658	2226	レベル1
30	JED025	Enderta	Shibta	Egriwenber	Egriwenber	555920	1491495	2238	レベル1
31	JED026	Enderta	Arato	Dean	Dean	567399	1492349	-	レベル1
32	JED027	Enderta	Arato	Endarbashelema	Endarbashelema	563361	1495252	2341	レベル1
33	JED032	Enderta	Lahama	Lahama	Lahama	572860	1481986	-	レベル1
34	JED033	Enderta	Lemlem	Akeza	Akeza	572574	1485081	2473	レベル1
35	JRA012	Raya Azebo	Bala Ulga	Butamfeta	Buta	585379	1372176	1677	レベル1
36	JRA013	Raya Azebo	Bala Ulga	Ulaga	Bisebir	587904	1375284	1604	レベル1
37	JKA001	Kilte Awlaelo	Mai quiha	Maidaero	Kembirto	554930	1525856	2102	レベル1
38	JKA003	Kilte Awlaelo	Debretsiyon	Debremear	Gelebet	546070	1528527	2104	レベル1
39	JKA004	Kilte Awlaelo	Debretsiyon	Debremear	Debremear	543903	1530533	2021	レベル1
40	JKA009	Kilte Awlaelo	Gemedede	Tsahilo	Kokay	561369	1526922	-	レベル1
41	JKA012	Kilte Awlaelo	Awolo	Awolo	Ziban adi	549998	1520609	2081	レベル1
42	JKA015	Kilte Awlaelo	Myweini	Sherafo	Around church	560804	1513410	1980	レベル1
43	JKA016	Kilte Awlaelo	Genfel	Dengolo	Adiarbea	562457	1524640	2001	レベル1
44	JKA017	Kilte Awlaelo	Abreha atsibha	Selam	Adikulala	556980	1532494	2016	レベル1
45	JKA018	Kilte Awlaelo	Abreha atsibha	Selam	Maichew	554153	1531491	1982	レベル1
46	JKA019	Kilte Awlaelo	Abreha atsibha	Mindae	Ekli	554277	1528505	-	レベル1
47	JDT001	Degua Temben	Mahiberesilase	Waseya	Waseya	513576	1510203	2583	レベル1
48	JDT003	Degua Temben	Siret	Endamariam	Endamariam	512908	1501556	2624	レベル1
49	JDT004	Degua Temben	Siret	Mahibere Shih	Mahibreshih	516912	1503075	2601	レベル1
50	JDT011	Degua Temben	Selam	Adiwerho	Adiwerho	521155	1511001	2216	レベル1
51	JDT012	Degua Temben	A Kegn	Alasa	Alasa	529257	1512874	2415	レベル1
52	JDT013	Degua Temben	A Kegn	Raset	Raset	527934	1510859	2433	レベル1
53	JDT018	Degua Temben	Arebay	Arebay	Arebay	528850	1516704	2631	レベル1
54	JDT019	Degua Temben	Arebay	Kelkele	Kelkele	528298	1518859	2442	レベル1
55	JKT001	Kola Temben	Merere	Chimate	Tsekente	481757	1512498	1946	レベル1
56	JKT003	Kola Temben	Merere	Guroro	Azewe	482194	1513216	-	レベル1
57	JKT005	Kola Temben	Santa gelebeda	Betro	Ater	522688	1529592	-	レベル1
58	JKT008	Kola Temben	Getsiki melsley	Endamariam	Sheka	500819	1511288	1892	レベル1
59	JKT009	Kola Temben	Getsiki melsley	Satava	Wersege	502078	1516122	1844	レベル1
60	JKT012	Kola Temben	Simret	Adichelo	Tsami	487713	1505773	1952	レベル1
61	JKT013	Kola Temben	Adiha	Siken	Tahitay Siken	508235	1520534	1733	レベル1
62	JKT014	Kola Temben	Workemba	Etanzore	Guzara	504722	1519589	1831	レベル1
63	JKT017	Kola Temben	Shilumemni	Tsiwatsiwa	Tsewanya	476452	1503176	1691	レベル1
64	JTA002	Tanqua Abergele	Lem'at	Adimilale	Adimilale	497890	1501437	1743	レベル1
65	JTA005	Tanqua Abergele	Felegehiwot	Guftamne	Guftamne	483706	1468478	1228	レベル1
66	JTA006	Tanqua Abergele	Felegehiwot	Erezna	Erezna	489234	1467954	1298	レベル1
67	JTA007	Tanqua Abergele	Siye	Hidmo(1)	Hidmo(1)	483988	1485953	1446	レベル1
68	JTA008	Tanqua Abergele	Siye	Hidmo(2)	Hidmo(2)	481790	1483764	1501	レベル1
69	JTA009	Tanqua Abergele	Siye	Gomenge	Gomenge	478933	1481800	1445	レベル1
70	JTA011	Tanqua Abergele	Siye	Teklemkerira	Teklemkerira	483783	1477320	1277	レベル1
71	JTA012	Tanqua Abergele	Siye	Metera	Metera	487775	1482792	1385	レベル1
72	JTA018	Tanqua Abergele	Jiiique	Jiiique	Jiiique	484252	1489519	1724	レベル1
73	JSS002	Seharti Samre	Neber Hadne	Fenarewa	Wete Kezena	503924	1447967	1493	レベル1
74	JSS008	Seharti Samre	Lemlem Aren	Seberwa	Tahitay Seberia	527869	1451647	1693	レベル1
75	JSS009	Seharti Samre	May Tekli	Terezeba	Bereziba	528114	1462143	2007	レベル1
76	JSS013	Seharti Samre	Bamba	Bamba	Harawa	507913	1482311	1611	レベル1
77	JHW001	Hawzen	Adibelow	Mererhuwa	-	531679	1541602	1915	レベル1
78	JHW003	Hawzen	Balieda	Adigefah	-	539525	1553409	1913	レベル1
79	JHW005	Hawzen	Debribizen	Setet	-	541404	1560528	2107	レベル1
80	JHW007	Hawzen	Debreselam	Berakit	-	535172	1540214	1916	レベル1
81	JHW010	Hawzen	Meztay	Dabaseria	-	551969	1554971	2300	レベル1
82	JHW015	Hawzen	Degamba	Degamba	-	550791	1557153	2380	レベル1
83	JHW016	Hawzen	Degamba	Shikut	-	550654	1559471	2345	レベル1
84	JHW017	Hawzen	Debrehiwot	Awadu	-	541745	1543912	2080	レベル1
85	JHW019	Hawzen	Siluh	Debrehawaz	-	546528	1546447	2231	レベル1
86	JAL002	Alamata	Selenwuha	Bedena leko	Bedena leko	578893	1361615	1391	レベル2
87	JAL004	Alamata	Gerjele	Gerjele	Gerjele town	566139	1380423	1475	レベル2
88	JAL005	Alamata	Laelay Dayu	Ula	Ula	563716	1382219	1596	レベル2
89	JRA001	Raya Azebo	Hadealga	Hadealga	Hadealga	583329	1395187	-	レベル2
90	JRA001	Raya Azebo	Hadealga	Hadealga	Keyih tekli	585735	1392560	-	レベル2
91	JRA001	Raya Azebo	Hawlti	Hirka	Hirka	575382	1418205	1734	レベル2
92	JRA002	Raya Azebo	Hawlti	Adialebachele	Adialebachele	574831	1419414	1755	レベル2
93	JRA002	Raya Azebo	Abo	Bechenrkatan	Bechenrkatan	573316	1423662	1753	レベル2
94	JRA003	Raya Azebo	Kara adishehu	Fondel	Fondel	567092	1403823	1705	レベル2
95	JRA004	Raya Azebo	Korme	Dodota	Dodota	580079	1382937	1687	レベル2
96	JRA005	Raya Azebo	Korme	Arva	Hadishkign	582325	1386253	1597	レベル2
97	JRA006	Raya Azebo	Werebaye	Gendijajo	Gemed dadi	567503	1400076	1671	レベル2
98	JRA007	Raya Azebo	Hadishkign	Hadishkign	Tachqubegala	578749	1374394	1406	レベル2
99	JR001	Raya Azebo	Hadalga	Deletie	-	583283	1399841	-	リハビリ
100	JR008	Raya Azebo	Hadeshe qenei	Bandera	-	573432	1373189	-	リハビリ
101	JR009	Raya Azebo	Ka/adishbo	Kepan	-	574125	1405575	-	リハビリ
102	JR014	Raya Azebo	Genete	Genete	-	567415	1410096	-	リハビリ