資料７　その他資料

成功井構造図

Site No. Koshe Town BH-1

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-1	Koshe	447544	886648	1,797 m	Koshe	Gurage	SNNPR	Ethiopia

Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diamater	Casing Position
21.09.13	3.11.2013		Top 500	Mud Rotary		GL -200.0m	0 to 10 14", 10m - 200m 12"	+0.8 to 200m 8"

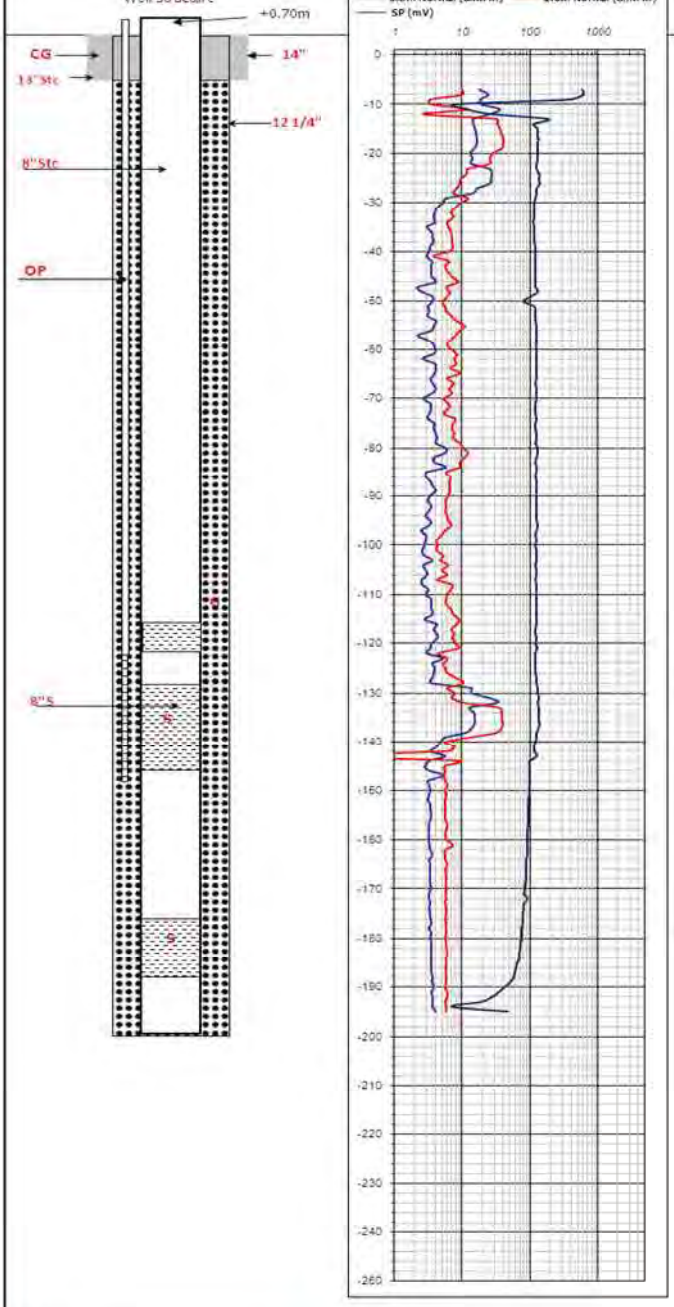
Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

8" Screen Position				Total Length
116m - 122m	128m -146m	176m -188m		36.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length:
	GS	3/4"			Threaded	170.0m	170.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Development :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (ltre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	36.5 m	14.8 m	36.0 l/s

Position of Casing and Well Structure



Well Column	Depth (m)	Lithology
	-20	Reworked Volcano clastic sediment:-
	-114m	Tuff :-
	-144m	**Basalt**:- Sconiaceous basalt with layer of pumice between 122m and 132m
	-200m	**Tuff & welded tuff**

SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Kella Town BH-1

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-2	Kella	444384	911784	1,691 m	KELLA	Gurage	SNNPR	Ethiopia

Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
19.11.2013	3.12.2013		Top 500	Mud Rotary		GL -99.0m	0 to 6 14", 6m -99m 12"	+0.8 to 99m 8"

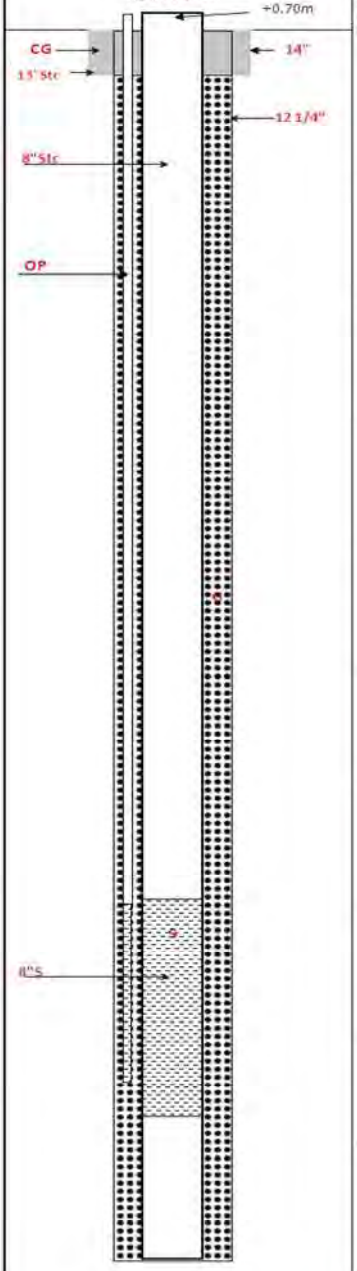
Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

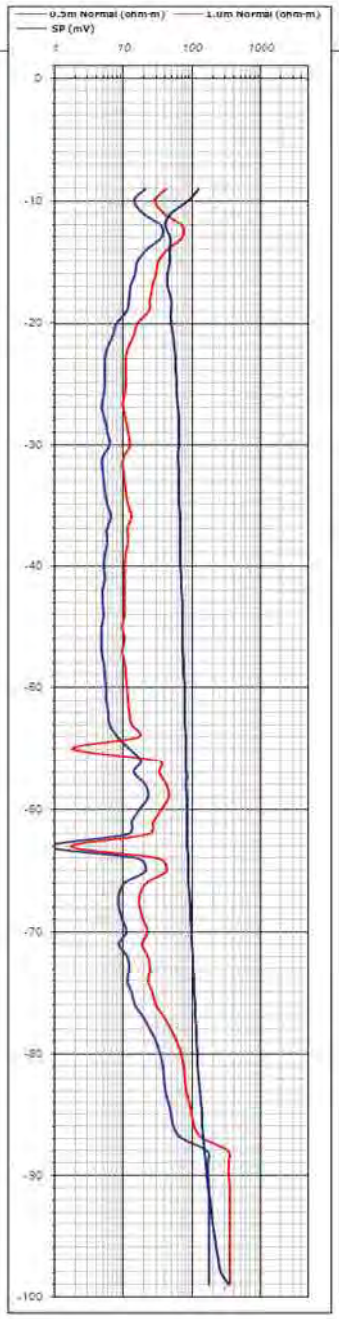
8" Screen Position	Total Length
57m - 63m, 69m - 87m	18.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length
	BS	3/4"			Threaded	84.0m	84.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Development :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	42.8 m	17.1 m	5.0 l/s

Position of Casing and Well Structure





Well Column	Depth (m)	Lithology
	-7	Clay and silt:-
	-30m	Sand:- With clay layer between 27m and 30m
	-38m	Basalt:- Weathered and Fractured
	-53m	Tuff
	-100m	Basalt:- weathered & fractured

SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Kella Town BH-2

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-2	Kella	444697	911678	1,891 m	KELLA	Gurage	SNNPR	Ethiopia

Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diamater	Casing Position
29.01.2014	13.02.2014		Top 500	Mud Rotary		GL -100.0m	0 to 6 14", 6m -100m 12"	+0.8 to 100m 8"

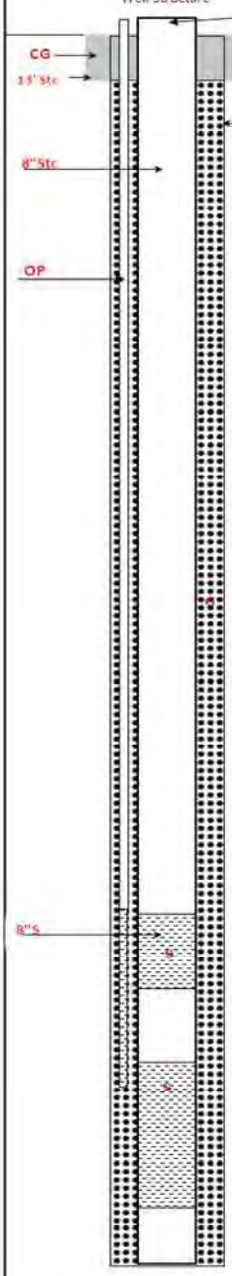
Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded		Steel	8"	2.0mm	Threaded

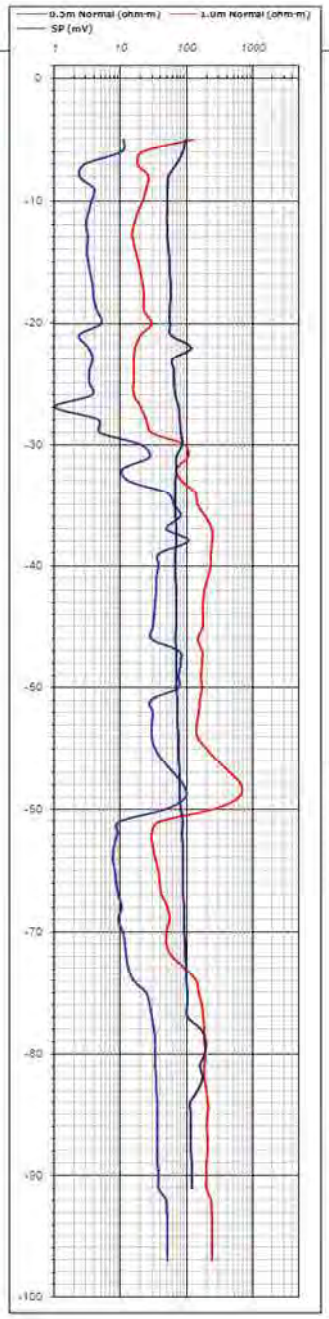
8" Screen Position	Total Length
54m - 76m, 82m - 94m	24.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth	Total Length
	GS	3/4"			Threaded	72.0m	72.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Divelopment :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	52.8 m	5.97 m	5.0 l/s

Position of Casing and Well Structure





Well Column	Depth (m)	Lithology
	-46m	**Sand:**- Volcano-clastic sand
	-83m	**Basalt:**- weathered & fractured
	-100m	**Silt:**- Light grey

SIMBOL:

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OP = observation pipe
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Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Tiya BH-1

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-1	Tiya	456201	931924	2,289 m	Tiya	Gurage	SNNPR	Ethiopia

Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
11/10/2013	14/11/2013		Top 300	DTH		GL -180.0m	0 to 4 12", 4m - 180m 12"	+0.8 to 180m 8"

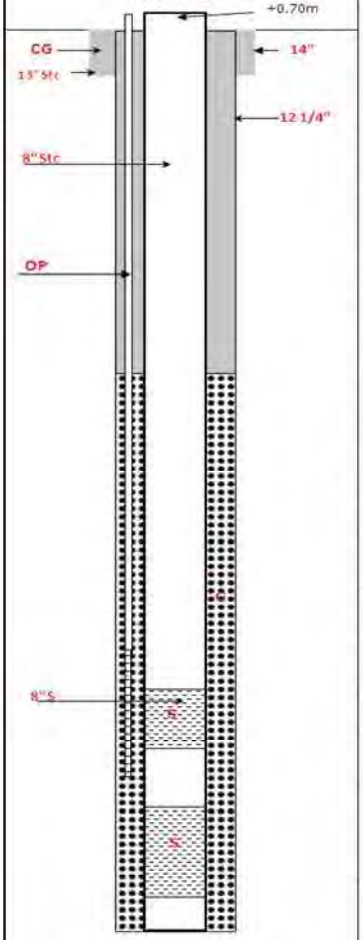
Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

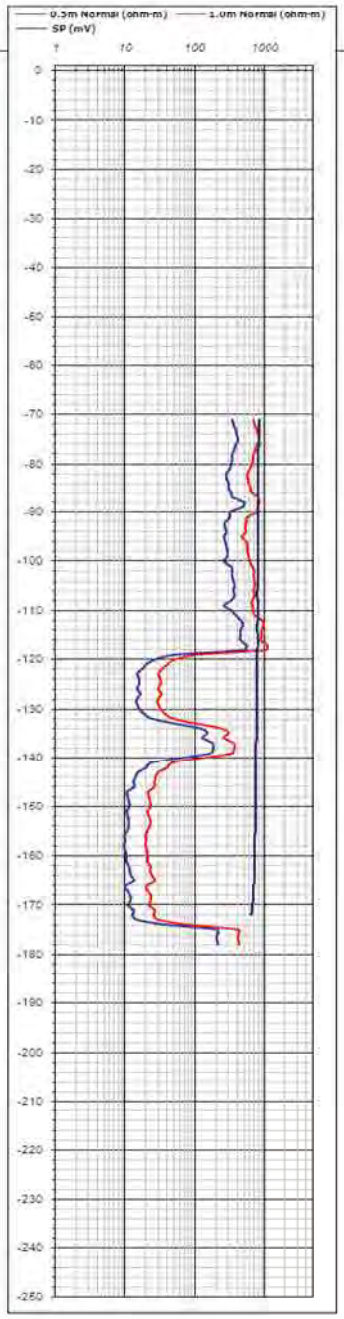
8" Screen Position			Total Length
120m - 144m	156m - 174m		33.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth	Total Length
	GS	3/4"			Threaded	150.0m	150.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Development :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 2-5mm		3.0 m³		Air	Air	123 m	70 m	2.0 l/s

Position of Casing and Well Structure





Well Column	Depth (m)	Lithology
	-10	**Welded Tuff:- Weathered**
	-28m	**Rhyolite:-**
	-39m	**Basalt:-** With minor silt and clay
	-93m	**Rhyolite:-**
	-116m	**Welded Tuff:-** Fractured and slightly weathered
	-134m	**Basalt:-** Weathered and fractured with layer of sandy gravel between 122m qnd 128m
	-144m	**Rhyolite:-** Fractured
	-150m	**Ignimbrite**
		Basalt:- Weathered and fractured

SIMBOL:

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Stc = Steel Casing
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P = Pump Position
R=Reducer

Site No. Adilo Town BH-1

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-1	Adilo	388335	797642		Adilo	Kembata	SNNPR	Ethiopia

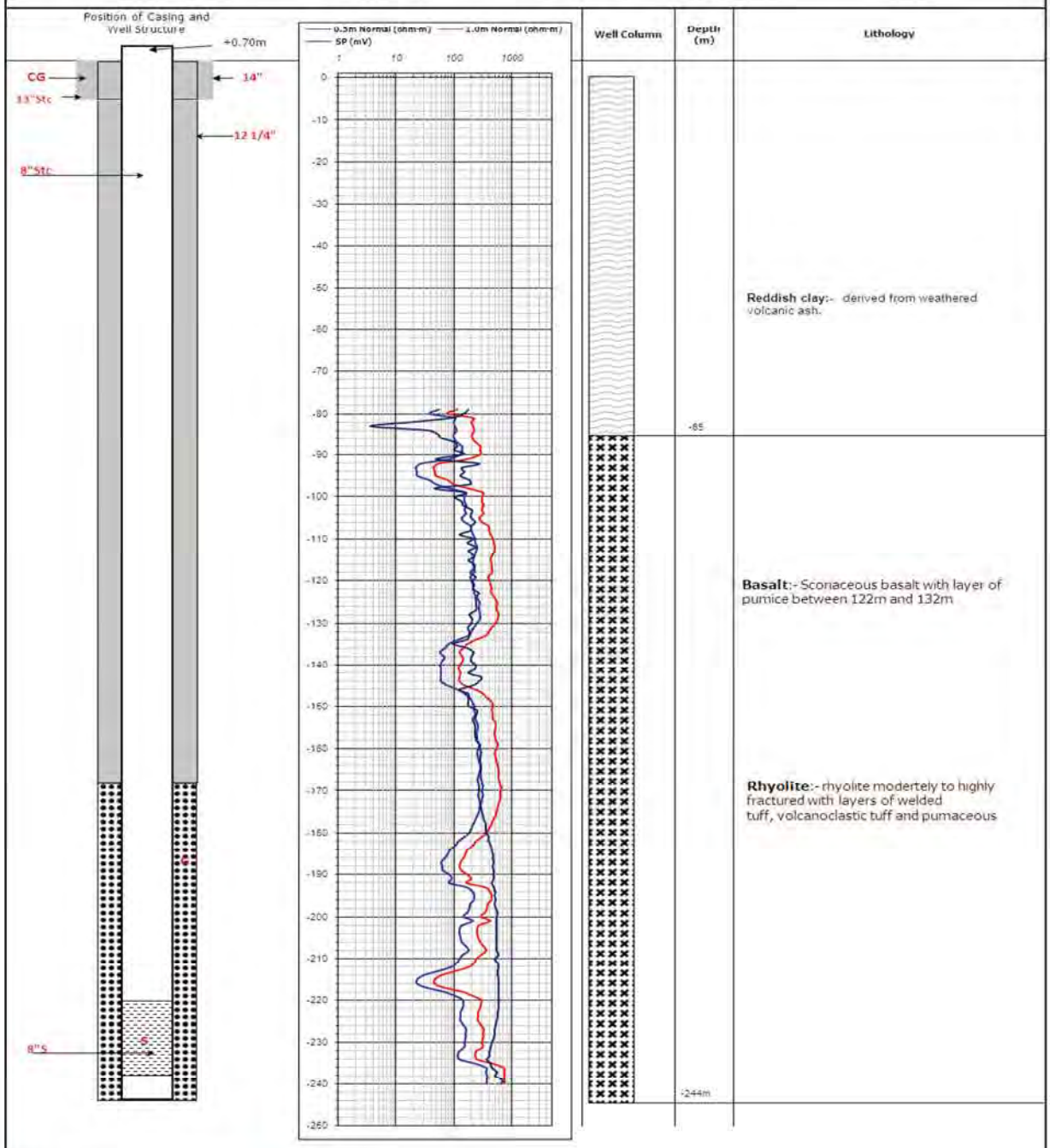
Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
20/11/13	19/12/13		Th-64	Mud Rotary		GL -244.0m	0 to 10, 14", 10m - 244m 12"	+0.8 to 244m 8"

Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded		Steel	8"	2.0mm	Threaded

8" Screen Position	Total Length
220m - 238m	18.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length:
	GS	3/4"			Threaded		

Gravel Packing	Origin	Gravel Size	Location	Volume	Development :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	194.4 m	193.5 m	5.0 l/s



SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Adilo Town BH-2

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
Bh-2	Adilo	387423	796781	1,949 m	Adilo	Kembata	SNNPR	Ethiopia

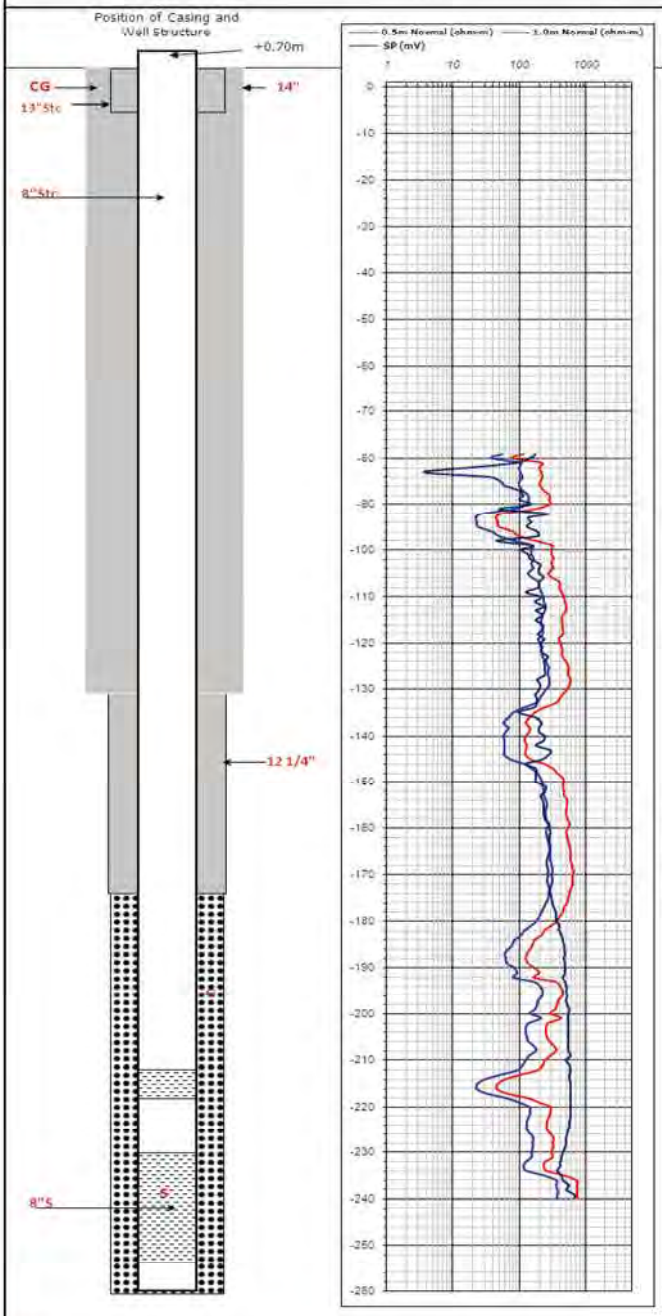
Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
26.12.11	26.01.12		Th-64	DTH		GL -260.0m	0 to 122 14", 122m - 260m 12"	+0.8 to 260m 8"

Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

8" Screen Position	Total Length
212m - 218m 230m - 254m	30.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length
	GS	3/4"			Threaded		

Gravel Pakking	Origin	Gravel Size	Location	Volume	Divelopment :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	198.0 m	197.7 m	5.0 l/s



Well Column	Depth (m)	Lithology
	-63	**Reddish clay:-** derived from weathered volcanic ash.
	-77	**Sand :-** Volcanoclastic sand
	-92	**Reddish clay derived from weathered volcanic ash.**
	-108m	**Sand :-** Volcanoclastic sand
	-260m	**Rhyolite:-** rhyolite modertely to highly fractured with layers of welded tuff and pumaceous tuff

SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Teferi KelaTown BH1

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-1	Teferi Kela	433796	718369	1,851 m	Teferi Kela	Sidama	SNNPR	Ethiopia

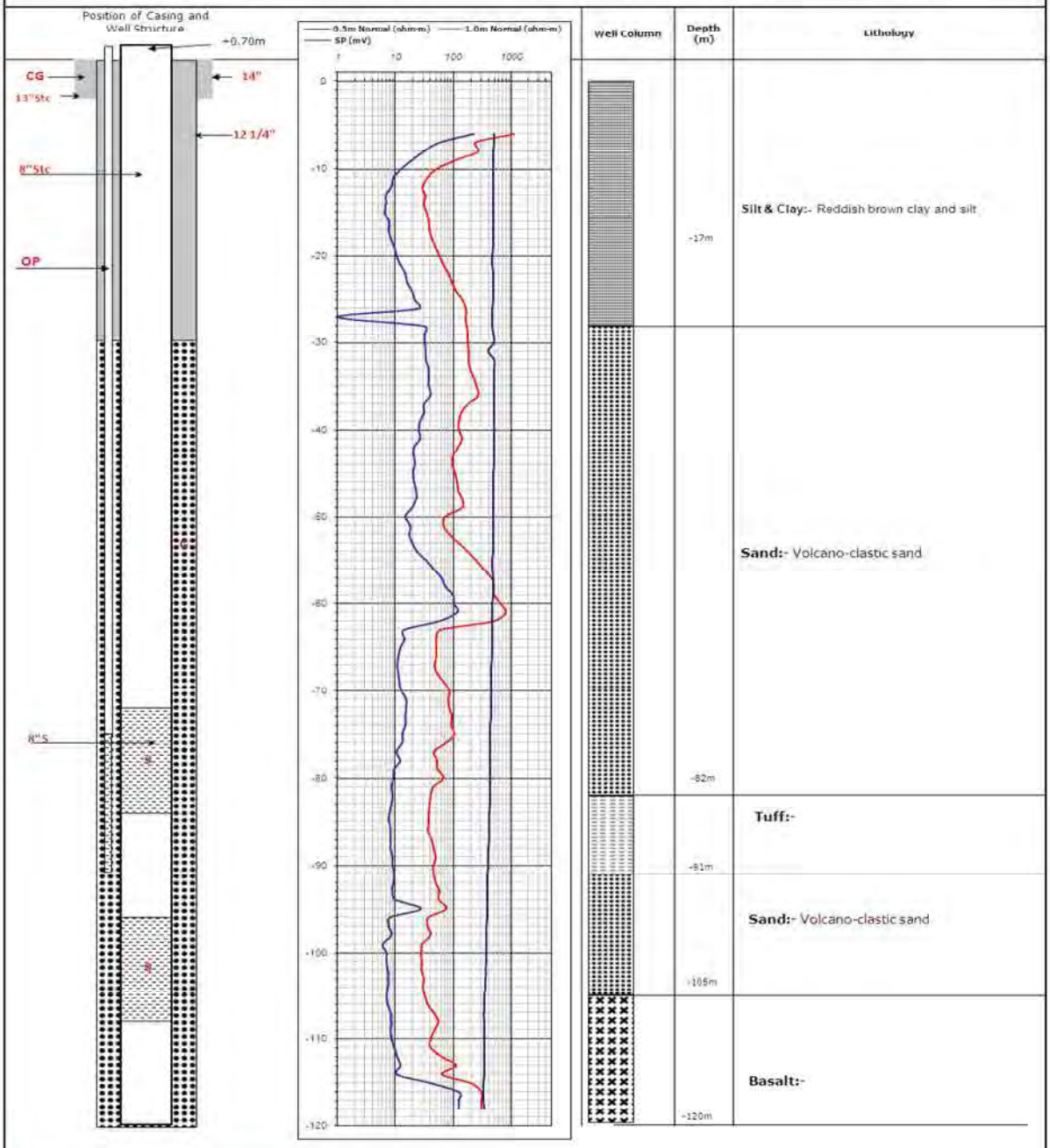
Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
15.12.13	6.2.2014		Top 300	Mud Rotary		GL -120.0m	0 to 10 14", 10m -120m 12"	+0.8 to 120m 8"

Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

8" Screen Position	Total Length
72m - 84m, 96m -108m	24.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length
	GS	3/4"			Threaded	102.0m	102.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Divelopment :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	47.6 m	11.28 m	5.0 l/s



SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Teferi KelaTown BH2

Well No.	Location	Coordinate (UTM)	Altitude	Town	Zone	State	Country
BH-2	Teferi Kela			Teferi Kela	Sidama	SNNPR	Ethiopia

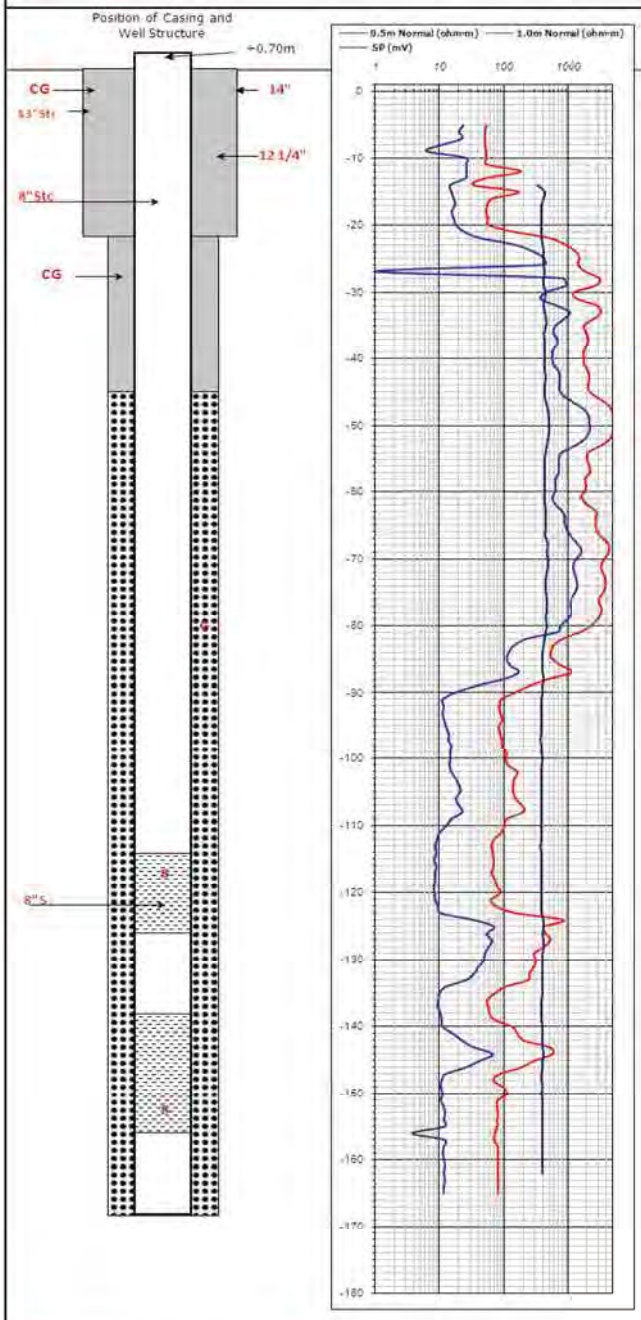
Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
22.2014	12.6.2014			Mud Rotary		GL -168.0m	0 to 21 14", 21m -168m 12"	40.6 to 166.7 8"

Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	219.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

8" Screen Position					Total Length
114m - 126m		138m -168m			30.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length:
	GS	3/4"			Threaded		

Gravel Pakking	Origin	Gravel Size	Location	Volume	Divelopment :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0m³		Air	Air	104.8 m	16.64 m	4.0 l/s



Well Column	Depth (m)	Lithology
	-16m	3m reddish brown clay soil followed by highly weathered pumaciewus tuff and clay
	-81m	**Diorite:**- Fresh and weathered and fractured around contact zones
	-168m	**Ignimbrite / Welded Tuff:**- Fresh to moderately weathred ignimbrite . At some zones highly weathered and fractured some times turened to clay

SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Mitto Town

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-1	Mitto	428498	849245	1,785 m	Mitto	Site	SNNPR	Ethiopia

Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
8/12/2013	27/12/2013		Top 500	Mud Rotary		GL -101.0m	0 to 6 14", 6m -101m 12"	+0.8 to 101m 8"

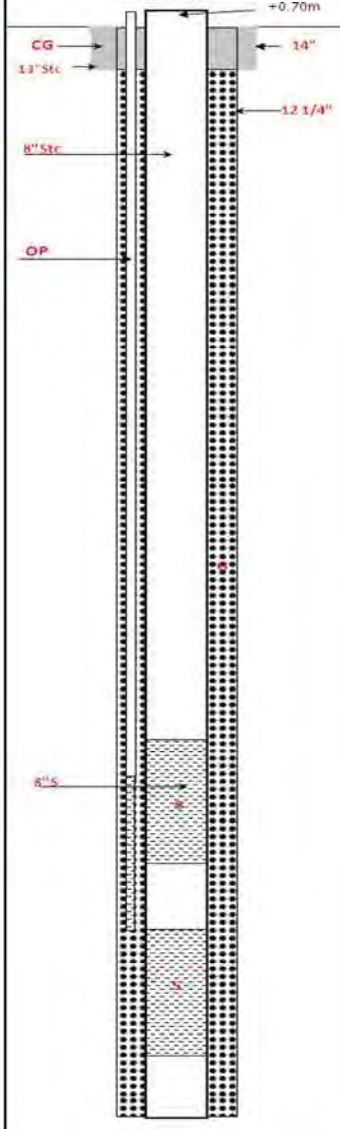
Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

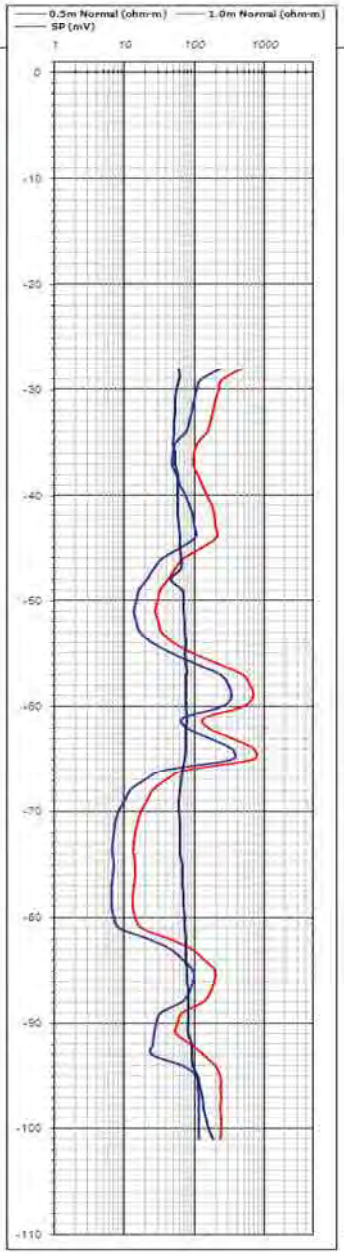
8" Screen Position					Total Length
	48m - 54m		66m - 84m		18.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length
	GS	3/4"			Threaded	64.0m	64.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Divelopment :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	36.3 m	29.30 m	14.3 l/s

Position of Casing and Well Structure





Well Column	Depth (m)	Lithology
	-17m	**Sand:**- sand with layers of silt
	-55m	**Welded tuff (Ignimbrite):**- weathered & fractured
	-68m	**Basalt:**- weathered & fractured
	-74m	**Silt:**- Light grey
	-101m	**Basalt:**- weathered & fractured

SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Alem Gebeya BH-1

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-1	Alem Gebeya	408434	835749	1,877 m	Tiya	Gurage	SNNPR	Ethiopia

Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
24/10/13	13/02/14		Top500	DTH		GL -176.0m	0 to 4 12", 4m - 176m 12"	+0.8 to 176m 8"

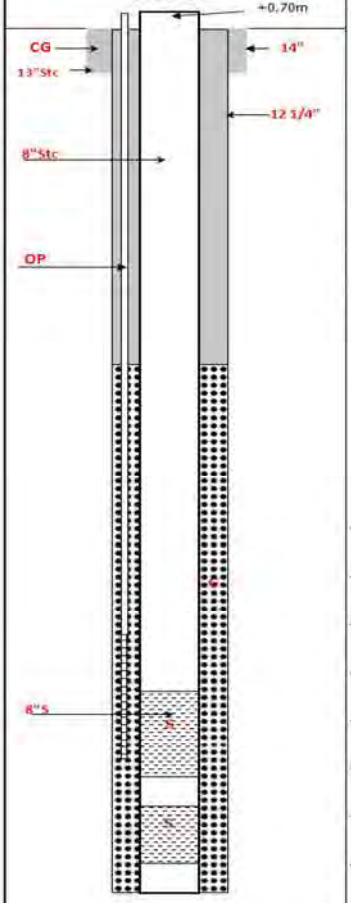
Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Silot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

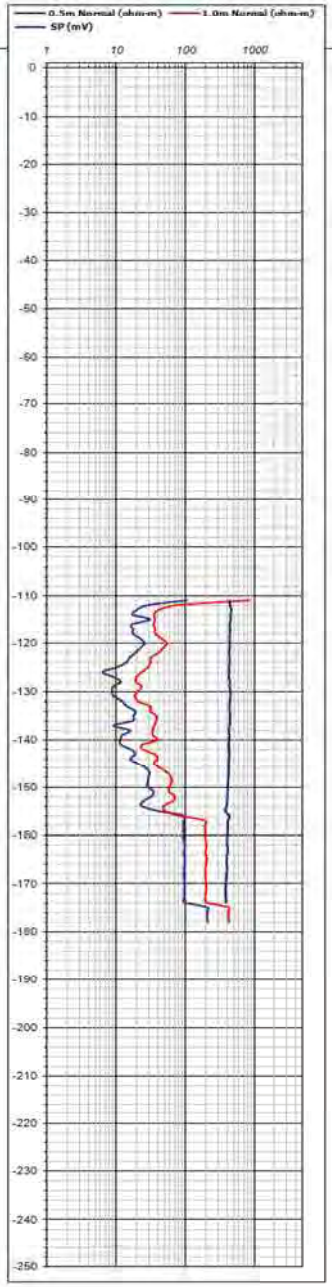
8" Screen Position	Total Length
134m - 152m, 158m - 170m	30.0m

Observation Pipe:	Material	Diameter	Silot Size	Open Rate	Joint Type	Installation depth:	Total Length
	GS	3/4"			Threaded	150.0m	150.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Divelopment :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 2-6mm		5.0 m³		Air	Air	122 m	110 m	9.7 l/s

Position of Casing and Well Structure





Well Column	Depth (m)	Lithology
	-8m	Tuff:- Weathered
	-20m	Rhyolite:-
	-50m	Tuff:-
	-64m	Volcanic Ash :-
	-104m	Rhyolite:-
	-158m	Sand:- Volcano clastic sediment
	-176m	Tuff:- with layers of volcnoclastic sands

SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Humbo (Tebela) Town BH-1

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-1	Humbo	363215	749924	1,494 m	Humbo	Wolaita	SNNPR	Ethiopia

Date: from	to	Drilling :	Equipment Type	Method	Well Type	Final Depth	Diameter	Casing Position
29.11.13	9.12.2014		Top 300	DTH		GL -86.0m	0 to 6 14", 6m -86m 12"	+0.8 to 86m 8"

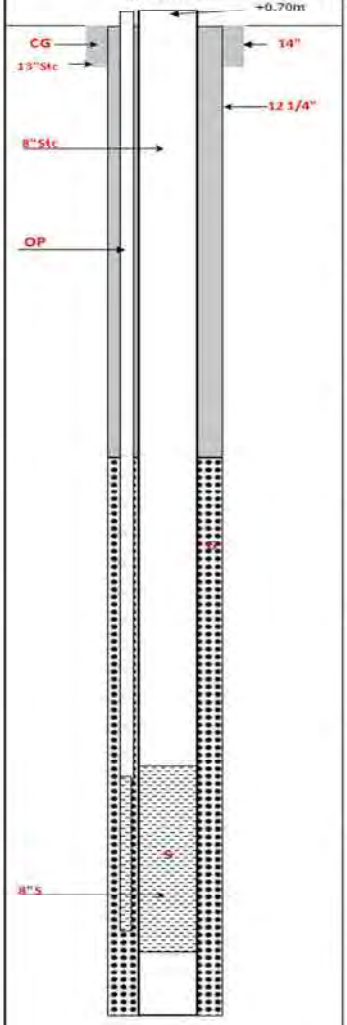
Casing Type :	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe :	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	219.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

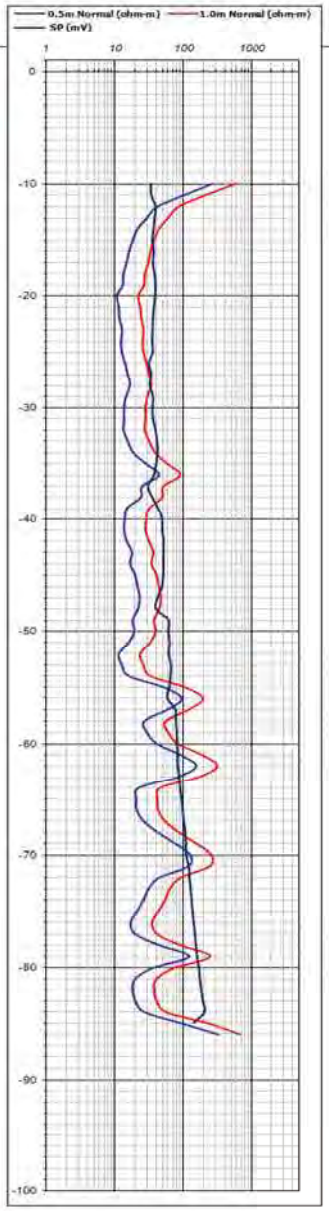
8" Screen Position	Total Length
64m - 82m	18.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length
	GS	3/4"			Threaded	78.0m	78.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Development :	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	35.5 m	11.1 m	24.5 l/s

Position of Casing and Well Structure





Well Column	Depth (m)	Lithology
	-20m	**Welded Tuff:**- Weathered
	-51m	**Tuff**
	-57m	**Sand:**- reworked volcanoclastic deposit
	-86m	**Basalt:**- weathered & fractured

SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
BS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

Site No. Kibet Town BH-1

Well No.	Location	Coordinate (UTM)		Altitude	Town	Zone	State	Country
BH-1	Kibet	427136	888297	2,083 m	Kibet	Site	SNNPR	Ethopia

Date: from	to	Drilling:	Equipment Type	Method	Well Type	Final Depth	Diamater	Casing Position
18/09/2013	30/09/2013		Top 500	Mud Rotary		GL -147.0m	0 to 6 14", 6m - 147m 12"	+0.8 to 147m 8"

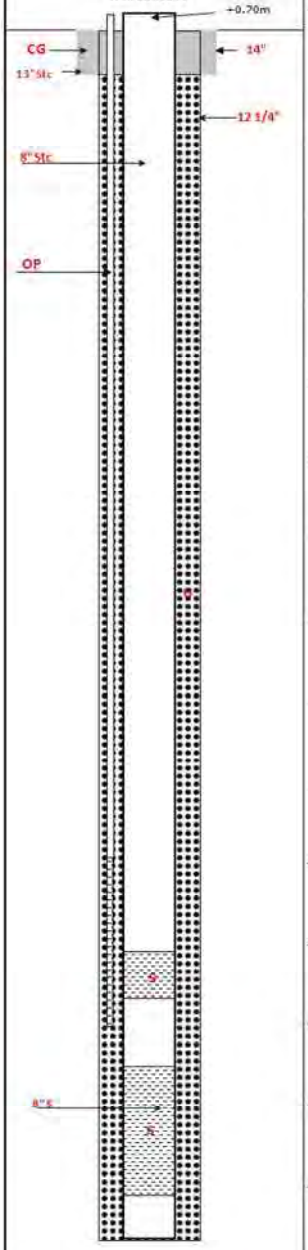
Casing Type:	Size	Inside Dia.	Outside Dia.	Joint Type	Screen Pipe:	Material	Diameter	Slot Size	Joint Type
Steel	8"	203.0mm	218.0mm	threaded	Steel	8"	203.0mm	2.0mm	Threaded

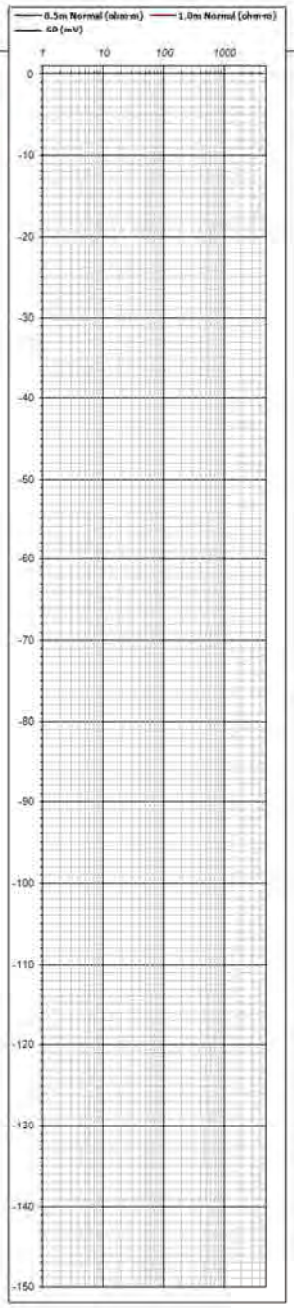
8" Screen Position			Total Length
111m - 117m	127m-141m		24.0m

Observation Pipe:	Material	Diameter	Slot Size	Open Rate	Joint Type	Installation depth:	Total Length
	GS	3/4"			Threaded	120.0m	120.0m

Gravel Pakking	Origin	Gravel Size	Location	Volume	Development:	Method	SWL (m)	DWL (m)	SWL (m)	Discharge (litre/sec)
	Basaltic	ø 4-6mm		5.0 m³		Air	Air	87.0 m	78.0 m	13.1 l/s

Position of Casing and Well Structure





Well Column	Depth (m)	Lithology
	-3	**Soil:**- Sanady soil
	-5	**Basalt:**- Vesicular fractured basalt
	-21	**Rhyolite:**- fractured
	-75m	**Tuff** :- pumaceous tuff light gray and reddish gray in weathered zones
	-80m	**Rhyolite:**- fractured
	-111m	**Reworked Volcanoclastic deposit** :- reworked materials derived from volcanic ash, scoria, lithic tuffs and pumaceous tuffs
	-120m	**Scoria :-** reworked scoria deposit mixed with sands of different origin
	-125m	**Rhyolite/Ignimbrite:**- Fractured and weathered
	-130m	**Reworked Volcanoclastic deposit** :- reworked materials derived from pyroclastic deposits
	-133m	**Rhyolite/Ignimbrite:**- Fractured and weathered
		Reworked Volcanoclastic deposit :- reworked materials derived from pyroclastic deposits
	-147m	**Rhyolite:**- Fractured and weathered

SIMBOL:

CG = Cement Grout
OP = observation pipe
G = Gravel
RS = Bentonite sealed
Stc = Steel Casing
S = Screen
P = Pump Position
R=Reducer

水質検査結果

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Gurage Zone				
DATE OF COLLECTION	14/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	KOSHE 01				
LAB.ID NO.	2371/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.37				7.0
Total Solids 105 ^{0}C (mg/l)	432.00				–
T. Dissolved Solid 105^{0}C(mg/l)	420.00				1776.0
Electrical Conductivity (µS/cm)	732.00				–
P^H	7.48				6.5-8.5
Ammonia (mg/l NH_3)	0.14				2.0
Sodium (mg/l Na)	136.00				358.0
Potassium (mg/l K)	17.00				–
Total Hardness (mg/l Ca CO_3)	70.00				392.0
Calcium (mg/l Ca)	20.00				–
Magnesium (mg/l Mg)	4.80				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.03				0.13
Fluoride (mg/l F)	1.77				3.0
Chloride (mg/l Cl)	10.01				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	0.57				50.0
Alkalinity (mg/l $CaCO_3$)	370.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	451.40				–
Sulphate (mg/l SO_4)	3.54				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.001				5.0
Aluminum(mg/l Al)	0.006				0.4
Chromium(mg/l Cr)	0.002				0.1
Boron(mg/l B)	0.114				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column. The water sample was collected and submitted to our laboratory by the client.

Checked by: _____
Date: 5/7/2013

Approved by: _____
Date: 05/07/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

					Ethiopian Standard maximum allowable Concentration (mg/l)
SOURCE OF SAMPLE	Well				
LOCATION	Gurage Zone				
DATE OF COLLECTION	15/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	KOSHE 02				–
LAB.ID NO.	2380/2005				
Colour (app)	Colourless				–
Odor	Odourless				–
Taste	Tasteless				7.0
Turbidity (NTU)	Nil				–
Total Solids 105 ^{0}C (mg/l)	464.00				1776.0
T. Dissolved Solid 105^{0}C(mg/l)	460.00				–
Electrical Conductivity (µS/cm)	772.00				6.5-8.5
P^H	7.08				2.0
Ammonia (mg/l NH_3)	0.18				358.0
Sodium (mg/l Na)	113.00				–
Potassium (mg/l K)	13.50				392.0
Total Hardness (mg/l Ca CO_3)	170.00				–
Calcium (mg/l Ca)	54.40				–
Magnesium (mg/l Mg)	8.16				0.4
Total Iron (mg/l Fe)	0.03				0.13
Manganese (mg/l Mn)	0.01				3.0
Fluoride (mg/l F)	1.24				533.0
Chloride (mg/l Cl)	16.38				6.0
Nitrite (mg/l NO_2)	0.02				50.0
Nitrate (mg/l NO_3)	2.57				–
Alkalinity (mg/l $CaCO_3$)	378.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	461.16				483.0
Sulphate (mg/l SO_4)	15.06				–
Phosphate (mg/l PO_4)	–				5.0
Copper(mg/l Cu)	0.006				0.4
Aluminum(mg/l Al)	0.002				0.1
Chromium(mg/l Cr)	0.001				0.3
Boron(mg/l B)	0.007				–
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: _____
Date: 5/7/2013

Approved by: _____
Date: 05/07/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

					Ethiopian Standard maximum allowable Concentration (mg/l)
SOURCE OF SAMPLE	Well				
LOCATION	Gurage Zone				
DATE OF COLLECTION	15/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	KELLA				
LAB.ID NO.	2375/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	Nil				7.0
Total Solids 105 ^{0}C (mg/l)	386.00				–
T. Dissolved Solid 105^{0}C(mg/l)	380.00				1776.0
Electrical Conductivity (µS/cm)	573				–
P^H	6.40				6.5-8.5
Ammonia (mg/l NH_3)	0.19				2.0
Sodium (mg/l Na)	18.50				358.0
Potassium (mg/l K)	4.70				–
Total Hardness (mg/l Ca CO_3)	250.00				392.0
Calcium (mg/l Ca)	81.60				–
Magnesium (mg/l Mg)	11.04				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.04				0.13
Fluoride (mg/l F)	0.51				3.0
Chloride (mg/l Cl)	10.92				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	12.42				50.0
Alkalinity (mg/l $CaCO_3$)	160				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	195.2				–
Sulphate (mg/l SO_4)	133.23				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.008				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.005				0.1
Boron(mg/l B)	0.057				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: _____
Date: 5/7/2013

Approved by: _____
Date: 05/07/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Gurage Zone				
DATE OF COLLECTION	17/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	TIYA				
LAB.ID NO.	2378/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.37				7.0
Total Solids 105 ^{0}C (mg/l)	212.00				–
T. Dissolved Solid 105^{0}C(mg/l)	200.00				1776.0
Electrical Conductivity (µS/cm)	354.00				–
P^H	6.60				6.5-8.5
Ammonia (mg/l NH_3)	0.20				2.0
Sodium (mg/l Na)	11.50				358.0
Potassium (mg/l K)	7.70				–
Total Hardness (mg/l Ca CO_3)	160.00				392.0
Calcium (mg/l Ca)	47.20				–
Magnesium (mg/l Mg)	10.08				–
Total Iron (mg/l Fe)	0.05				0.4
Manganese (mg/l Mn)	0.01				0.13
Fluoride (mg/l F)	0.63				3.0
Chloride (mg/l Cl)	5.46				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	0.67				50.0
Alkalinity (mg/l $CaCO_3$)	184.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	224.48				–
Sulphate (mg/l SO_4)	0.33				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.006				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.001				0.1
Boron(mg/l B)	0.107				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column. The water sample was collected and submitted to our laboratory by the client.

Checked by: _____ Approved by: _____
Date: 5/7/2013 Date: 05/07/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Sodo				
DATE OF COLLECTION	13/6/2013				
DATE RECEIVED	14/6/2013				
CLIENTS ID.NO.	ADILO				
LAB.ID NO.	2367/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.37				7.0
Total Solids 105 ^{0}C (mg/l)	190.00				–
T. Dissolved Solid 105^{0}C(mg/l)	180.00				1776.0
Electrical Conductivity (µS/cm)	313				–
P^H	6.95				6.5-8.5
Ammonia (mg/l NH_3)	0.14				2.0
Sodium (mg/l Na)	32.00				358.0
Potassium (mg/l K)	9.90				–
Total Hardness (mg/l Ca CO_3)	92.00				392.0
Calcium (mg/l Ca)	20.00				–
Magnesium (mg/l Mg)	10.08				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.02				0.13
Fluoride (mg/l F)	0.65				3.0
Chloride (mg/l Cl)	3.64				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	0.78033				50.0
Alkalinity (mg/l $CaCO_3$)	160				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	195.2				–
Sulphate (mg/l SO_4)	0.22				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.004				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.006				0.1
Boron(mg/l B)	0.079				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column. The water sample was collected and submitted to our laboratory by the client.

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Date: 5/7/2013

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Date: 05/07/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS

Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

					Ethiopian Standard maximum allowable Concentration (mg/l)
SOURCE OF SAMPLE	Well				
LOCATION	Sodo				
DATE OF COLLECTION	12/6/2013				
DATE RECEIVED	14/6/2013				
CLIENTS ID.NO.	TEFERI KELLA				
LAB.ID NO.	2370/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.37				7.0
Total Solids 105 ^{0}C (mg/l)	230.00				–
T. Dissolved Solid 105^{0}C(mg/l)	220.00				1776.0
Electrical Conductivity (µS/cm)	381.00				–
P^H	7.36				6.5-8.5
Ammonia (mg/l NH_3)	0.16				2.0
Sodium (mg/l Na)	52.00				358.0
Potassium (mg/l K)	3.90				–
Total Hardness (mg/l Ca CO_3)	74.00				392.0
Calcium (mg/l Ca)	18.40				–
Magnesium (mg/l Mg)	6.72				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.02				0.13
Fluoride (mg/l F)	0.86				3.0
Chloride (mg/l Cl)	3.64				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	0.40				50.0
Alkalinity (mg/l $CaCO_3$)	204.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	248.88				–
Sulphate (mg/l SO_4)	0.11				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.005				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.002				0.1
Boron(mg/l B)	0.007				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

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Date: 5/7/2013

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Date: 05/7/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

					Ethiopian Standard maximum allowable Concentration (mg/l)
SOURCE OF SAMPLE	Well				
LOCATION	Silte Zone				
DATE OF COLLECTION	15/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	DALOCHA				
LAB.ID NO.	2377/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.4				7.0
Total Solids 105 ^{0}C (mg/l)	220.00				–
T. Dissolved Solid 105^{0}C(mg/l)	210.00				1776.0
Electrical Conductivity (µS/cm)	358.00				–
P^H	6.83				6.5-8.5
Ammonia (mg/l NH_3)	0.12				2.0
Sodium (mg/l Na)	49.00				358.0
Potassium (mg/l K)	9.40				–
Total Hardness (mg/l Ca CO_3)	62.00				392.0
Calcium (mg/l Ca)	18.40				–
Magnesium (mg/l Mg)	3.84				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.01				0.13
Fluoride (mg/l F)	1.45				3.0
Chloride (mg/l Cl)	5.46				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	0.91				50.0
Alkalinity (mg/l $CaCO_3$)	180.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	219.60				–
Sulphate (mg/l SO_4)	0.22				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.002				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.001				0.1
Boron(mg/l B)	0.086				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column. The water sample was collected and submitted to our laboratory by the client.

Checked by: Tesfaye
Date: 5/7/2013

Approved by:
Date: 05/07/2013

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Silte Zone				
DATE OF COLLECTION	15/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	MITTO				
LAB.ID NO.	2376/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	Nil				7.0
Total Solids 105 ^{0}C (mg/l)	278.00				–
T. Dissolved Solid 105^{0}C(mg/l)	270.00				1776.0
Electrical Conductivity (µS/cm)	429.00				–
P^H	7.09				6.5-8.5
Ammonia (mg/l NH_3)	0.19				2.0
Sodium (mg/l Na)	58.00				358.0
Potassium (mg/l K)	10.00				–
Total Hardness (mg/l Ca CO_3)	126.00				392.0
Calcium (mg/l Ca)	28.00				–
Magnesium (mg/l Mg)	13.44				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.03				0.13
Fluoride (mg/l F)	0.74				3.0
Chloride (mg/l Cl)	7.28				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	3.31				50.0
Alkalinity (mg/l $CaCO_3$)	226.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	275.72				–
Sulphate (mg/l SO_4)	0.89				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.004				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.005				0.1
Boron(mg/l B)	0.064				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: Teifu
Date: 5/7/2013

Approved by:
Date: 05/07/2013

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

					Ethiopian Standard maximum allowable Concentration (mg/l)
SOURCE OF SAMPLE	Well				
LOCATION	Silte Zone				
DATE OF COLLECTION	14/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	TORRA 01				
LAB.ID NO.	2374/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.37				7.0
Total Solids 105 ^{0}C (mg/l)	612.00				–
T. Dissolved Solid 105^{0}C(mg/l)	600.00				1776.0
Electrical Conductivity (µS/cm)	971.00				–
P^H	7.19				6.5-8.5
Ammonia (mg/l NH_3)	0.15				2.0
Sodium (mg/l Na)	180.00				358.0
Potassium (mg/l K)	22.00				–
Total Hardness (mg/l Ca CO_3)	130.00				392.0
Calcium (mg/l Ca)	48.00				–
Magnesium (mg/l Mg)	2.40				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.04				0.13
Fluoride (mg/l F)	1.64				3.0
Chloride (mg/l Cl)	23.66				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	1.18				50.0
Alkalinity (mg/l $CaCO_3$)	474.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	578.28				–
Sulphate (mg/l SO_4)	36.55				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.001				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.004				0.1
Boron(mg/l B)	0.129				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: Tufa
Date: 5/7/2013

Approved by:
Date: 05/07/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

					Ethiopian Standard maximum allowable Concentration (mg/l)
SOURCE OF SAMPLE	Well				
LOCATION	Silte Zone				
DATE OF COLLECTION	14/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	TORRA 02				
LAB.ID NO.	2373/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.37				7.0
Total Solids 105 ^{0}C (mg/l)	628.00				–
T. Dissolved Solid 105^{0}C(mg/l)	620.00				1776.0
Electrical Conductivity (µS/cm)	1002.00				–
P^H	7.48				6.5-8.5
Ammonia (mg/l NH_3)	0.17				2.0
Sodium (mg/l Na)	166.00				358.0
Potassium (mg/l K)	21.00				–
Total Hardness (mg/l Ca CO_3)	122.00				392.0
Calcium (mg/l Ca)	46.40				–
Magnesium (mg/l Mg)	1.44				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.03				0.13
Fluoride (mg/l F)	1.63				3.0
Chloride (mg/l Cl)	28.21				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	0.80				50.0
Alkalinity (mg/l $CaCO_3$)	456.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	556.32				–
Sulphate (mg/l SO_4)	51.94				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.005				5.0
Aluminum(mg/l Al)	0.006				0.4
Chromium(mg/l Cr)	0.007				0.1
Boron(mg/l B)	0.150				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: _____
Date: 5/7/2013

Approved by: _____
Date: 05/7/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Sodo				
DATE OF COLLECTION	13/6/2013				
DATE RECEIVED	14/6/2013				
CLIENTS ID.NO.	SANKURA				
LAB.ID NO.	2369/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.4				7.0
Total Solids 105 ^{0}C (mg/l)	408.00				–
T. Dissolved Solid 105^{0}C(mg/l)	400.00				1776.0
Electrical Conductivity (µS/cm)	640.00				–
P^H	7.82				6.5-8.5
Ammonia (mg/l NH_3)	0.15				2.0
Sodium (mg/l Na)	105.0				358.0
Potassium (mg/l K)	13.00				–
Total Hardness (mg/l Ca CO_3)	136.00				392.0
Calcium (mg/l Ca)	44.00				–
Magnesium (mg/l Mg)	6.24				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.04				0.13
Fluoride (mg/l F)	1.63				3.0
Chloride (mg/l Cl)	5.46				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	0.44				50.0
Alkalinity (mg/l $CaCO_3$)	338.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	412.36				–
Sulphate (mg/l SO_4)	0.22				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.005				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.004				0.1
Boron(mg/l B)	0.114				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: _____
Date: 5/7/2013

Approved by: _____
Date: 05/7/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Silte Zone				
DATE OF COLLECTION	25/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	KIBET-01				
LAB.ID NO.	2372/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.37				7.0
Total Solids 105 ^{0}C (mg/l)	316.00				–
T. Dissolved Solid 105^{0}C(mg/l)	300.00				1776.0
Electrical Conductivity (µS/cm)	486.00				–
P^H	6.50				6.5-8.5
Ammonia (mg/l NH_3)	0.15				2.0
Sodium (mg/l Na)	41.00				358.0
Potassium (mg/l K)	10.10				–
Total Hardness (mg/l Ca CO_3)	176.00				392.0
Calcium (mg/l Ca)	62.40				–
Magnesium (mg/l Mg)	4.80				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.03				0.13
Fluoride (mg/l F)	0.59				3.0
Chloride (mg/l Cl)	7.28				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	12.25				50.0
Alkalinity (mg/l $CaCO_3$)	226.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	275.72				–
Sulphate (mg/l SO_4)	4.87				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.005				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.001				0.1
Boron(mg/l B)	0.114				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: _____
Date: 5/7/2013

Approved by: _____
Date: 05/07/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

					Ethiopian Standard maximum allowable Concentration (mg/l)
SOURCE OF SAMPLE	Well				
LOCATION	Silte Zone				
DATE OF COLLECTION	15/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	KIBET 02				
LAB.ID NO.	2379/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	Nil				7.0
Total Solids 105 ^{0}C (mg/l)	266.00				–
T. Dissolved Solid 105^{0}C(mg/l)	260.00				1776.0
Electrical Conductivity (µS/cm)	455.00				–
P^H	6.65				6.5-8.5
Ammonia (mg/l NH_3)	0.19				2.0
Sodium (mg/l Na)	33.50				358.0
Potassium (mg/l K)	9.30				–
Total Hardness (mg/l Ca CO_3)	166.00				392.0
Calcium (mg/l Ca)	49.60				–
Magnesium (mg/l Mg)	10.08				–
Total Iron (mg/l Fe)	0.04				0.4
Manganese (mg/l Mn)	0.01				0.13
Fluoride (mg/l F)	0.63				3.0
Chloride (mg/l Cl)	6.37				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	6.01				50.0
Alkalinity (mg/l $CaCO_3$)	222.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	270.84				–
Sulphate (mg/l SO_4)	1.77				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.004				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.006				0.1
Boron(mg/l B)	0.007				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: _____
Date: 5/7/2013

Approved by: _____
Date: 05/07/2013

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

					Ethiopian Standard maximum allowable Concentration (mg/l)
SOURCE OF SAMPLE	Well				
LOCATION	Silte Zone				
DATE OF COLLECTION	15/6/2013				
DATE RECEIVED	17/6/2013				
CLIENTS ID.NO.	LAKE				
LAB.ID NO.	2381/2003				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.73				7.0
Total Solids 105 ^{0}C (mg/l)	300.00				–
T. Dissolved Solid 105^{0}C(mg/l)	280.00				1776.0
Electrical Conductivity (µS/cm)	438.00				–
p^H	8.56				6.5-8.5
Ammonia (mg/l NH_3)	0.19				2.0
Sodium (mg/l Na)	47.00				358.0
Potassium (mg/l K)	12.00				–
Total Hardness (mg/l Ca CO_3)	150.00				392.0
Calcium (mg/l Ca)	33.60				–
Magnesium (mg/l Mg)	15.84				–
Total Iron (mg/l Fe)	0.04				0.4
Manganese (mg/l Mn)	0.02				0.13
Fluoride (mg/l F)	0.55				3.0
Chloride (mg/l Cl)	10.01				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	0.46				50.0
Alkalinity (mg/l $CaCO_3$)	236.00				–
Carbonate (mg/l CO_3)	36.00				–
Bicarbonate (mg/l HCO_3)	214.72				–
Sulphate (mg/l SO_4)	0.29				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.005				5.0
Aluminum(mg/l Al)	0.004				0.4
Chromium(mg/l Cr)	0.002				0.1
Boron(mg/l B)	0.007				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: [signature]
Date: 5/7/2013

Approved by: [signature]
Date: 05/7/2013

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Water Works Design and
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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project:AG CONSULT, Consulting Hydrogeologyist and Engineers

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Sodo				
DATE OF COLLECTION	13/6/2013				
DATE RECEIVED	14/6/2013				
CLIENTS ID.NO.	TEBELLA				
LAB.ID NO.	2368/2005				–
Colour (app)	Colourless				
Odor	Odourless				–
Taste	Tasteless				–
Turbidity (NTU)	0.37				7.0
Total Solids 105 ^{0}C (mg/l)	172.00				–
T. Dissolved Solid 105^{0}C(mg/l)	160.00				1776.0
Electrical Conductivity (µS/cm)	260.00				–
P^H	6.90				6.5-8.5
Ammonia (mg/l NH_3)	0.14				2.0
Sodium (mg/l Na)	15.00				358.0
Potassium (mg/l K)	4.90				–
Total Hardness (mg/l Ca CO_3)	104.00				392.0
Calcium (mg/l Ca)	29.60				–
Magnesium (mg/l Mg)	7.20				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	0.02				0.13
Fluoride (mg/l F)	0.52				3.0
Chloride (mg/l Cl)	2.73				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	2.17				50.0
Alkalinity (mg/l $CaCO_3$)	138.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	168.36				–
Sulphate (mg/l SO_4)	0.22				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.001				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.002				0.1
Boron(mg/l B)	0.100				0.3
Lead (mg/l)	Nil				–
Total Coliform Per 100 ml	–				–
Fecal Coliform Per 100 ml	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) presented on the last column.The water sample was collected and submitted to our laboratory by the client.

Checked by: Tesfu
Date: 5/7/2013

Approved by:
Date: 05/07/2013

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Gurage Zone				
DATE OF COLLECTION	26/11/2013				
DATE RECEIVED	29/11/2013				
CLIENTS ID.NO.	Tiya				
LAB.ID NO.	923/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	244.00				–
T. Dissolved Solid 105^{0}C(mg/l)	240.00				1776.0
Electrical Conductivity (µS/cm)	398.00				–
P^H	7.60				6.5-8.5
Ammonia (mg/l NH_3)	0.29				2.0
Sodium (mg/l Na)	25.00				358.0
Potassium (mg/l K)	7.90				–
Total Hardness (mg/l Ca CO_3)	172.00				392.0
Calcium (mg/l Ca)	44.00				–
Magnesium (mg/l Mg)	14.88				–
Total Iron (mg/l Fe)	0.07				0.4
Manganese (mg/l Mn)	0.03				0.13
Fluoride (mg/l F)	0.86				3.0
Chloride (mg/l Cl)	6.37				533.0
Nitrite (mg/l NO_2)	0.04				6.0
Nitrate (mg/l NO_3)	0.74				50.0
Alkalinity (mg/l $CaCO_3$)	214.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	261.08				–
Sulphate (mg/l SO_4)	0.22				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.005				5.0
Aluminum(mg/l Al)	0.008				0.4
Chromium(mg/l Cr)	Trace				0.1
Boron(mg/l B)	0.072				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column.The water sample was collected and submitted to our laboratory by the client.

Tested by: _____ Processed By _____ Checked by: _____ Approved by: _____
Date: 23-12-2013 Date 23/12/2013 Date 24/12/13 Date: 24/12/13

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Gurage Zone				
DATE OF COLLECTION	30/12/2013				
DATE RECEIVED	2/1/2014				
CLIENTS ID.NO.	Koshe				
LAB.ID NO.	1196/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	470.0				–
T. Dissolved Solid 105^{0}C(mg/l)	460.0				1776.0
Electrical Conductivity (µS/cm)	750				–
P^H	7.97				6.5-8.5
Ammonia (mg/l NH_3)	1.53				2.0
Sodium (mg/l Na)	138.00				358.0
Potassium (mg/l K)	8.60				–
Total Hardness (mg/l Ca CO_3)	70.00				392.0
Calcium (mg/l Ca)	16.80				–
Magnesium (mg/l Mg)	6.72				–
Total Iron (mg/l Fe)	0.17				0.4
Manganese (mg/l Mn)	0.06				0.13
Fluoride (mg/l F)	1.14				3.0
Chloride (mg/l Cl)	5.46				533.0
Nitrite (mg/l NO_2)	Trace				6.0
Nitrate (mg/l NO_3)	0.08				50.0
Alkalinity (mg/l $CaCO_3$)	410.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	500.20				–
Sulphate (mg/l SO_4)	0.33				483.0
Phosphate (mg/l PO_4)	0.49				–
Copper(mg/l Cu)	Trace				5.0
Aluminum(mg/l Al)	0.012				0.4
Chromium(mg/l Cr)	0.002				0.1
Boron(mg/l B)	0.063				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column.The water sample was collected and submitted to our laboratory by the client.

Tested by: Date: 17/1/14
Processed By Date 17/1/14
Checked by: Date 17/1/14
Approved by: Date: 17/1/14

Water Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Gurage Zone				
DATE OF COLLECTION	2/1/2014				
DATE RECEIVED	9/1/2014				
CLIENTS ID.NO.	Kella				
LAB.ID NO.	1221/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	388.00				–
T. Dissolved Solid 105^{0}C(mg/l)	380.00				1776.0
Electrical Conductivity (µS/cm)	570.00				–
P^H	7.12				6.5-8.5
Ammonia (mg/l NH_3)	0.24				2.0
Sodium (mg/l Na)	21.50				358.0
Potassium (mg/l K)	7.00				–
Total Hardness (mg/l Ca CO_3)	264.00				392.0
Calcium (mg/l Ca)	84.00				–
Magnesium (mg/l Mg)	12.96				–
Total Iron (mg/l Fe)	0.10				0.4
Manganese (mg/l Mn)	Trace				0.13
Fluoride (mg/l F)	0.61				3.0
Chloride (mg/l Cl)	3.64				533.0
Nitrite (mg/l NO_2)	Trace				6.0
Nitrate (mg/l NO_3)	1.73				50.0
Alkalinity (mg/l $CaCO_3$)	212.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	258.64				–
Sulphate (mg/l SO_4)	114.90				483.0
Phosphate (mg/l PO_4)	–				–
Copper(mg/l Cu)	0.033				5.0
Aluminum(mg/l Al)	Trace				0.4
Chromium(mg/l Cr)	0.001				0.1
Boron(mg/l B)	0.065				0.3
Zinc (mg/l)	–				15

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column. The water sample was collected and submitted to our laboratory by the client.

Tested by: _____ Date: 17/01/14
Processed By _____ Date 17/1/14
Checked by: _____ Date 17/01/14
Approved by: _____ Date: 17/01/14

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Wolaita				
DATE OF COLLECTION	19/1/2014				
DATE RECEIVED	28/1/2014				
CLIENTS ID.NO.	Humbo				
LAB.ID NO.	1431/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	216.00				–
T. Dissolved Solid 105^{0}C(mg/l)	210.00				1776.0
Electrical Conductivity (µS/cm)	352.00				–
P^H	6.88				6.5-8.5
Ammonia (mg/l NH_3)	0.14				2.0
Sodium (mg/l Na)	35.50				358.0
Potassium (mg/l K)	8.90				–
Total Hardness (mg/l Ca CO_3)	108.00				392.0
Calcium (mg/l Ca)	27.20				–
Magnesium (mg/l Mg)	9.60				–
Total Iron (mg/l Fe)	0.03				0.4
Manganese (mg/l Mn)	Trace				0.13
Fluoride (mg/l F)	0.58				3.0
Chloride (mg/l Cl)	3.64				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	0.74				50.0
Alkalinity (mg/l $CaCO_3$)	180.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	219.60				–
Sulphate (mg/l SO_4)	0.22				483.0
Phosphate (mg/l PO_4)	0.22				–
Copper(mg/l Cu)	Trace				5.0
Aluminum(mg/l Al)	0.002				0.4
Chromium(mg/l Cr)	0.001				0.1
Boron(mg/l B)	0.120				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column.The water sample was collected and submitted to our laboratory by the client.

Tested by: [signature] Processed By [signature] Checked by: [signature] Approved by: [signature]
Date: 04-02-2014 Date 4/2/14 Date 5/2/14 Date: 5/2/14

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Silte				
DATE OF COLLECTION	23/1/2014				
DATE RECEIVED	28/1/2014				
CLIENTS ID.NO.	Mito				
LAB.ID NO.	1432/2006				_
Colour (app)	Colourless				_
Odor	Odorless				_
Taste	Tasteless				_
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	272.00				_
T. Dissolved Solid 105^{0}C(mg/l)	260.00				1776.0
Electrical Conductivity (µS/cm)	430.00				_
P^H	7.56				6.5-8.5
Ammonia (mg/l NH_3)	0.15				2.0
Sodium (mg/l Na)	53.00				358.0
Potassium (mg/l K)	10.00				_
Total Hardness (mg/l Ca CO_3)	118.00				392.0
Calcium (mg/l Ca)	22.40				_
Magnesium (mg/l Mg)	14.88				_
Total Iron (mg/l Fe)	0.04				0.4
Manganese (mg/l Mn)	Trace				0.13
Fluoride (mg/l F)	1.96				3.0
Chloride (mg/l Cl)	7.28				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	4.14				50.0
Alkalinity (mg/l $CaCO_3$)	214.00				_
Carbonate (mg/l CO_3)	Nil				_
Bicarbonate (mg/l HCO_3)	261.08				_
Sulphate (mg/l SO_4)	0.33				483.0
Phosphate (mg/l PO_4)	0.26				_
Copper(mg/l Cu)	0.007				5.0
Aluminum(mg/l Al)	Trace				0.4
Chromium(mg/l Cr)	Trace				0.1
Boron(mg/l B)	0.240				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column.The water sample was collected and submitted to our laboratory by the client.

Tested by: [signature] Processed By [signature] Checked by: [signature] Approved by: [signature]
Date: 04-02-2014 Date 04/02/2014 Date 5/2/14 Date: 5/2/14

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	–				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Silite Zone				
DATE OF COLLECTION	4/2/2014				
DATE RECEIVED	10/2/2014				
CLIENTS ID.NO.	Kibet No 1				
LAB.ID NO.	1525/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	312.00				–
T. Dissolved Solid 105^{0}C(mg/l)	300.00				1776.0
Electrical Conductivity (µS/cm)	467.00				–
P^H	6.69				6.5-8.5
Ammonia (mg/l NH_3)	0.21				2.0
Sodium (mg/l Na)	33.00				358.0
Potassium (mg/l K)	8.70				–
Total Hardness (mg/l Ca CO_3)	184.00				392.0
Calcium (mg/l Ca)	63.20				–
Magnesium (mg/l Mg)	6.24				–
Total Iron (mg/l Fe)	0.02				0.4
Manganese (mg/l Mn)	0.06				0.13
Fluoride (mg/l F)	0.58				3.0
Chloride (mg/l Cl)	6.37				533.0
Nitrite (mg/l NO_2)	0.06				6.0
Nitrate (mg/l NO_3)	19.12				50.0
Alkalinity (mg/l $CaCO_3$)	230.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	280.60				–
Sulphate (mg/l SO_4)	2.77				483.0
Phosphate (mg/l PO_4)	0.19				–
Copper(mg/l Cu)	0.0198				5.0
Aluminum(mg/l Al)	Trace				0.4
Chromium(mg/l Cr)	0.010				0.1
Boron(mg/l B)	0.233				0.3
Zinc (mg/l)	–				–

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column.The water sample was collected and submitted to our laboratory by the client.

Tested by: Date: 17/02/14
Processed By Date 17/2/14
Checked by: Date 17/2/14
Approved by: Date: 17/2/14

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Gurage				
DATE OF COLLECTION	15/2/2014				
DATE RECEIVED	19/2/2014				
CLIENTS ID.NO.	Kela No-2				
LAB.ID NO.	1604/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	288.00				–
T. Dissolved Solid 105^{0}C(mg/l)	280.00				1776.0
Electrical Conductivity (µS/cm)	422.00				–
P^H	6.57				6.5-8.5
Ammonia (mg/l NH_3)	0.16				2.0
Sodium (mg/l Na)	33.00				358.0
Potassium (mg/l K)	5.50				–
Total Hardness (mg/l Ca CO_3)	164.00				392.0
Calcium (mg/l Ca)	47.20				–
Magnesium (mg/l Mg)	11.04				–
Total Iron (mg/l Fe)	0.07				0.4
Manganese (mg/l Mn)	0.01				0.13
Fluoride (mg/l F)	1.06				3.0
Chloride (mg/l Cl)	7.28				533.0
Nitrite (mg/l NO_2)	0.02				6.0
Nitrate (mg/l NO_3)	1.01				50.0
Alkalinity (mg/l $CaCO_3$)	180.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	219.60				–
Sulphate (mg/l SO_4)	44.54				483.0
Phosphate (mg/l PO_4)	0.24				–
Copper(mg/l Cu)	0.020				5.0
Aluminum(mg/l Al)	0.008				0.4
Chromium(mg/l Cr)	0.006				0.1
Boron(mg/l B)	0.006				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column. The water sample was collected and submitted to our laboratory by the client.

Tested by: [signature] Processed By [signature] Checked by: [signature] Approved by: [signature]
Date: 25/2/14 Date 25/2/14 Date 26/2/14 Date: 26/2/14

Water Works Design and Supervision Enterprise Laboratory Service

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Water Works Design and Supervision Enterprise Laboratory Service Sub Process
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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Silte				
DATE OF COLLECTION	18/2/2014				
DATE RECEIVED	19/2/2014				
CLIENTS ID.NO.	Alem gebeya				
LAB.ID NO.	1606/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	472.00				–
T. Dissolved Solid 105^{0}C(mg/l)	460.00				1776.0
Electrical Conductivity (µS/cm)	706.00				–
P^H	7.10				6.5-8.5
Ammonia (mg/l NH_3)	0.12				2.0
Sodium (mg/l Na)	109.00				358.0
Potassium (mg/l K)	11.90				–
Total Hardness (mg/l Ca CO_3)	160.00				392.0
Calcium (mg/l Ca)	45.60				–
Magnesium (mg/l Mg)	11.04				–
Total Iron (mg/l Fe)	0.16				0.4
Manganese (mg/l Mn)	0.09				0.13
Fluoride (mg/l F)	2.04				3.0
Chloride (mg/l Cl)	5.46				533.0
Nitrite (mg/l NO_2)	0.05				6.0
Nitrate (mg/l NO_3)	0.25				50.0
Alkalinity (mg/l $CaCO_3$)	384.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	468.48				–
Sulphate (mg/l SO_4)	0.44				483.0
Phosphate (mg/l PO_4)	0.12				–
Copper(mg/l Cu)	0.040				5.0
Aluminum(mg/l Al)	0.010				0.4
Chromium(mg/l Cr)	0.004				0.1
Boron(mg/l B)	0.025				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column. The water sample was collected and submitted to our laboratory by the client.

Tested by: _____ Date: 25/2/14
Processed By _____ Date 25/2/14
Checked by: _____ Date 26/2/14
Approved by: _____ Date: 26/2/14

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Silte				
DATE OF COLLECTION	13/2/2014				
DATE RECEIVED	19/2/2014				
CLIENTS ID.NO.	Mito				
LAB.ID NO.	1605/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	270.00				–
T. Dissolved Solid 105^{0}C(mg/l)	260.00				1776.0
Electrical Conductivity (µS/cm)	420.00				–
P^H	7.33				6.5-8.5
Ammonia (mg/l NH_3)	0.11				2.0
Sodium (mg/l Na)	46.50				358.0
Potassium (mg/l K)	9.60				–
Total Hardness (mg/l Ca CO_3)	132.00				392.0
Calcium (mg/l Ca)	33.60				–
Magnesium (mg/l Mg)	11.52				–
Total Iron (mg/l Fe)	0.04				0.4
Manganese (mg/l Mn)	0.01				0.13
Fluoride (mg/l F)	1.12				3.0
Chloride (mg/l Cl)	4.55				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	3.07				50.0
Alkalinity (mg/l $CaCO_3$)	210.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	256.20				–
Sulphate (mg/l SO_4)	0.22				483.0
Phosphate (mg/l PO_4)	0.17				–
Copper(mg/l Cu)	0.026				5.0
Aluminum(mg/l Al)	0.006				0.4
Chromium(mg/l Cr)	0.007				0.1
Boron(mg/l B)	0.051				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column. The water sample was collected and submitted to our laboratory by the client.

Tested by: _____ Date: 25/2/14
Processed By _____ Date 25/2/14
Checked by: _____ Date 26/2/14
Approved by: _____ Date: 26/2/14

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Sidama Zone				
DATE OF COLLECTION	19/2/2014				
DATE RECEIVED	25/2/2014				
CLIENTS ID.NO.	Teferi Kela				
LAB.ID NO.	1622/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	2.92				7.0
Total Solids 105 ^{0}C (mg/l)	216.00				–
T. Dissolved Solid 105^{0}C(mg/l)	200.00				1776.0
Electrical Conductivity (µS/cm)	302.00				–
P^H	6.97				6.5-8.5
Ammonia (mg/l NH_3)	0.16				2.0
Sodium (mg/l Na)	51.50				358.0
Potassium (mg/l K)	8.30				–
Total Hardness (mg/l Ca CO_3)	50.00				392.0
Calcium (mg/l Ca)	12.80				–
Magnesium (mg/l Mg)	4.32				–
Total Iron (mg/l Fe)	0.32				0.4
Manganese (mg/l Mn)	0.01				0.13
Fluoride (mg/l F)	0.70				3.0
Chloride (mg/l Cl)	5.46				533.0
Nitrite (mg/l NO_2)	0.13				6.0
Nitrate (mg/l NO_3)	4.66				50.0
Alkalinity (mg/l $CaCO_3$)	158.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	192.76				–
Sulphate (mg/l SO_4)	0.78				483.0
Phosphate (mg/l PO_4)	0.26				–
Copper(mg/l Cu)	0.05				5.0
Aluminum(mg/l Al)	Trace				0.4
Chromium(mg/l Cr)	0.011				0.1
Boron(mg/l B)	Trace				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column. The water sample was collected and submitted to our laboratory by the client.

Tested by: [signature] Date: 4/3/2014
Processed By [signature] Date 4/3/14
Checked by: [signature] Date 04/03/14
Approved by: [signature] Date: 04/03/14

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Wolaita				
DATE OF COLLECTION	3/3/2014				
DATE RECEIVED	3/3/2014				
CLIENTS ID.NO.	Adilo No-1				
LAB.ID NO.	1682/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	196.00				–
T. Dissolved Solid 105^{0}C(mg/l)	186.00				1776.0
Electrical Conductivity (µS/cm)	289.00				–
P^H	6.72				6.5-8.5
Ammonia (mg/l NH_3)	0.15				2.0
Sodium (mg/l Na)	33.50				358.0
Potassium (mg/l K)	9.80				–
Total Hardness (mg/l Ca CO_3)	86.00				392.0
Calcium (mg/l Ca)	23.20				–
Magnesium (mg/l Mg)	6.72				–
Total Iron (mg/l Fe)	0.06				0.4
Manganese (mg/l Mn)	Trace				0.13
Fluoride (mg/l F)	0.71				3.0
Chloride (mg/l Cl)	8.19				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	0.36				50.0
Alkalinity (mg/l $CaCO_3$)	150.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	183.00				–
Sulphate (mg/l SO_4)	0.19				483.0
Phosphate (mg/l PO_4)	0.65				–
Copper(mg/l Cu)	0.013				5.0
Aluminum(mg/l Al)	0.014				0.4
Chromium(mg/l Cr)	0.007				0.1
Boron(mg/l B)	0.042				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column. The water sample was collected and submitted to our laboratory by the client.

Tested by: _____ Date: 07/03/14
Processed By _____ Date 7/3/14
Checked by: _____ Date 10/03/14
Approved by: _____ Date: 20/3/14

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				Ethiopian Standard maximum allowable Concentration (mg/l)
LOCATION	Wolaita				
DATE OF COLLECTION	3/3/2014				
DATE RECEIVED	3/4/2014				
CLIENTS ID.NO.	Adilo No-2				
LAB.ID NO.	1683/2006				–
Colour (app)	Colourless				–
Odor	Odorless				–
Taste	Tasteless				–
Turbidity (NTU)	Trace				7.0
Total Solids 105 ^{0}C (mg/l)	198.00				–
T. Dissolved Solid 105^{0}C(mg/l)	190.00				1776.0
Electrical Conductivity (µS/cm)	295.00				–
P^H	6.75				6.5-8.5
Ammonia (mg/l NH_3)	0.21				2.0
Sodium (mg/l Na)	36.50				358.0
Potassium (mg/l K)	10.10				–
Total Hardness (mg/l Ca CO_3)	92.00				392.0
Calcium (mg/l Ca)	24.00				–
Magnesium (mg/l Mg)	7.68				–
Total Iron (mg/l Fe)	0.11				0.4
Manganese (mg/l Mn)	Trace				0.13
Fluoride (mg/l F)	0.70				3.0
Chloride (mg/l Cl)	6.37				533.0
Nitrite (mg/l NO_2)	0.01				6.0
Nitrate (mg/l NO_3)	0.42				50.0
Alkalinity (mg/l $CaCO_3$)	156.00				–
Carbonate (mg/l CO_3)	Nil				–
Bicarbonate (mg/l HCO_3)	190.32				–
Sulphate (mg/l SO_4)	0.19				483.0
Phosphate (mg/l PO_4)	0.27				–
Copper(mg/l Cu)	0.020				5.0
Aluminum(mg/l Al)	0.018				0.4
Chromium(mg/l Cr)	0.009				0.1
Boron(mg/l B)	0.036				0.3

REMARK:- The test result can be compared with the Ethiopian Standard maximum allowable concentration (mg/l) indicated on the last column. The water sample was collected and submitted to our laboratory by the client.

Tested by: Date: 07/03/14
Processed By Date 7/3/14
Checked by: Date 10/03/14
Approved by: Date: 10/3/14

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				
LOCATION	Alemgeheya				
DATE OF COLLECTION	21/3/2014				
DATE RECEIVED	24/3/2014				
CLIENTS ID.NO.	Alemgebeya 8hr				
LAB.ID NO.	1997/2006				
Colour (app)	Colourless				
Odor	Odorless				
Taste	Tasteless				
Turbidity (NTU)	Trace				
Total Solids 105 ^{0}C (mg/l)	468.00				
T. Dissolved Solid 105^{0}C(mg/l)	460.00				
Electrical Conductivity (µS/cm)	723.00				
P^H	7.27				
Ammonia (mg/l NH_3)	0.34				
Sodium (mg/l Na)	113.00				
Potassium (mg/l K)	12.90				
Total Hardness (mg/l Ca CO_3)	160.00				
Calcium (mg/l Ca)	51.20				
Magnesium (mg/l Mg)	7.68				
Total Iron (mg/l Fe)	0.05				
Manganese (mg/l Mn)	0.00				
Fluoride (mg/l F)	1.57				
Chloride (mg/l Cl)	5.46				
Nitrite (mg/l NO_2)	0.01				
Nitrate (mg/l NO_3)	1.17				
Alkalinity (mg/l $CaCO_3$)	386.00				
Carbonate (mg/l CO_3)	Nil				
Bicarbonate (mg/l HCO_3)	470.92				
Sulphate (mg/l SO_4)	0.19				
Phosphate (mg/l PO_4)	0.27				
Copper(mg/l Cu)	0.033				
Aluminum(mg/l Al)	0.006				
Chromium(mg/l Cr)	Trace				
Boron(mg/l B)	0.040				
Zinc (mg/l)	0.128				

REMARK:- The water sample was collected and submitted to our laboratory by the client.

Tested by: _____ Date: 09/04/14
Processed By _____ Date 9/4/14
Checked by: _____ Date 9/4/14
Approved by: _____ Date: 9/04/14

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				
LOCATION	Alemgeheya				
DATE OF COLLECTION	22/3/2014				
DATE RECEIVED	24/3/2014				
CLIENTS ID.NO.	Alemgebeya 24hr				
LAB.ID NO.	1998/2006				
Colour (app)	Colourless				
Odor	Odorless				
Taste	Tasteless				
Turbidity (NTU)	Trace				
Total Solids I05 ^{0}C (mg/l)	490.0				
T. Dissolved Solid 105^{0}C(mg/l)	480.0				
Electrical Conductivity (µS/cm)	737.00				
P^H	7.2				
Ammonia (mg/l NH_3)	0.32				
Sodium (mg/l Na)	112.00				
Potassium (mg/l K)	16.00				
Total Hardness (mg/l Ca CO_3)	180.00				
Calcium (mg/l Ca)	56.00				
Magnesium (mg/l Mg)	9.60				
Total Iron (mg/l Fe)	0.07				
Manganese (mg/l Mn)	0.00				
Fluoride (mg/l F)	1.36				
Chloride (mg/l Cl)	6.37				
Nitrite (mg/l NO_2)	0.09				
Nitrate (mg/l NO_3)	2.33				
Alkalinity (mg/l $CaCO_3$)	390.00				
Carbonate (mg/l CO_3)	Nil				
Bicarbonate (mg/l HCO_3)	475.80				
Sulphate (mg/l SO_4)	0.19				
Phosphate (mg/l PO_4)	0.21				
Copper(mg/l Cu)	0.0132				
Aluminum(mg/l Al)	0.014				
Chromium(mg/l Cr)	Trace				
Boron(mg/l B)	0.030				
Zinc (mg/l)	0.115				

REMARK:- The water sample was collected and submitted to our laboratory by the client.

Tested by: _____ Date: 09/04/14
Processed By _____ Date 9/04/14
Checked by: _____ Date 9/4/14
Approved by: _____ Date: 9/04/14

Water Works Design and Supervision Enterprise Laboratory Service

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SELECTED PHYSIO CHEMICAL AND BACTERIOLOGICAL WATER ANALYSIS RESULTS
Client/Project: TAM Geo-Engineering P.L.C.

SOURCE OF SAMPLE	Well				
LOCATION	Sidama				
DATE OF COLLECTION	15/6/2014				
DATE RECEIVED	26/6/2014				
CLIENTS ID.NO.	BH-2 Teferi Kella				
LAB.ID NO.	2823/2006				
Colour (app)	Colourless				
Odor	Odorless				
Taste	Tasteless				
Turbidity (NTU)	Trace				
Total Solids I05 ^{0}C (mg/l)	248.00				
T. Dissolved Solid 105^{0}C(mg/l)	240.00				
Electrical Conductivity (µS/cm)	396.00				
P^H	7.64				
Ammonia (mg/l NH_3)	0.32				
Sodium (mg/l Na)	63.00				
Potassium (mg/l K)	4.00				
Total Hardness (mg/l Ca CO_3)	66.00				
Calcium (mg/l Ca)	16.80				
Magnesium (mg/l Mg)	5.76				
Total Iron (mg/l Fe)	0.02				
Manganese (mg/l Mn)	Trace				
Fluoride (mg/l F)	1.38				
Chloride (mg/l Cl)	10.01				
Nitrite (mg/l NO_2)	0.002				
Nitrate (mg/l NO_3)	0.45				
Alkalinity (mg/l $CaCO_3$)	198.00				
Carbonate (mg/l CO_3)	Nil				
Bicarbonate (mg/l HCO_3)	241.56				
Sulphate (mg/l SO_4)	0.33				
Phosphate (mg/l PO_4)	0.19				
Copper(mg/l Cu)	0.040				
Aluminum(mg/l Al)	0.002				
Chromium(mg/l Cr)	Trace				
Boron(mg/l B)	0.119				

REMARK:- The water sample was collected and submitted to our laboratory by the client.

Tested by: Date: 27/6/14
Processed By Date 27/6/14
Checked by: Date 27/6/14
Approved by: Date: 27/6/14

Water Works Design and Supervision Enterprise Laboratory Service