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19 April 2011
419573

Kouga Municipality
PO Box 21
JEFFREYS BAY
6330

Attention: Mr Eddie Oosthuizen

Dear Sir

Kouga Municipality Groundwater Investigation : Production Borehole Site Assessment

1. Introduction

1.1 Background

In May 2010 SRK Consulting submitted two proposals to Kouga Municipality to undertake groundwater development work for the Municipality. The one proposal called for the assessment of the groundwater potential in the Kouga Municipal area and the other for a detailed assessment of the existing production boreholes.

Kouga Municipality subsequently appointed SRK Consulting for the Groundwater Potential study but not the Borehole Assessment. The Borehole Assessment included a detailed investigation of the existing borehole infrastructure, test pumping and quality analysis.

SRK decided to carry out a visual inspection of the boreholes to assess the condition of the infrastructure and to compile a data base with the available information.

This was done at no cost to the Municipality.

2. Methodology

A visual inspection of the boreholes was carried out together with literature reviews of previous reports. Discussions were held with various representatives from the Kouga Municipality that are responsible for the operation and maintenance of the boreholes.

Data regarding the borehole pumps, motors, yield and water quality where not verified during this assessment (borehole pumps where removed from the boreholes for inspection). This information can only be verified during the pump testing of the relevant boreholes.

The following production boreholes where assessed:

- Humansdorp : 2 No.
- Jefferys Bay : 8 No.
- St Francis Bay : 9 No.
- Oyster Bay : 2 No.
- Kruisfontein : 2 No.

Refer to Appendix 1 for figures showing the borehole positions.

3. Assessment

The visual assessment of the production boreholes and related infrastructure where carried out in June 2010. The findings were generally similar for all the boreholes and can be summarised as follows:

- The pump, motor and pipework of the boreholes seems to be in a reasonable condition
- Some of the water meters and valves is not operational
- The control panel consists of only a manual on/off switch and is in reasonable condition. The panel is connected via cable to the main distribution panel. The distribution panel is operated from the office at the water treatment facility by telemetry
- Control panel casing is weathered
- Most of the borehole dipper tubes has been removed
- Some boreholes does not have chambers and where there are chambers present they require minor repairs
- There are limited access control to the boreholes (fence and gate)

Based on the assessment, the following remedial works is recommended:

- Pipework to be cleaned
- Defective water meters and valves must be replaced
- New control panel to installed
- Re-install dipper tubes
- Borehole chambers to be constructed where required (Appendix 4)
- Provide fencing to control unauthorised access to the boreholes
- Supply new name boards

Refer to Appendix 2 for tables detailing the borehole equipment and Appendix 3 for photographs.

4. Cost

Based on the assessment, the cost associated with the remedial works at the boreholes is estimated at an average of R 20 000 excl VAT per borehole.

Table 4-1 : Construction Cost

Area	Cost
Humansdorp (2No)	R 40 000
Jefferys Bay (8No)	R 160 000
St Francis Bay (9No)	R 180 000
Oyster Bay (2No)	R 40 000
Kruisfontein (2No)	R 40 000
Total (excl VAT)	**R 460 000**

The professional fees and disbursements for the management and implementation of the works will be based on time and cost basis and is estimated to be about **R 80 000 excl VAT**.

5. Conclusions

The production boreholes utilised by the Kouga Municipality is generally in a working condition and is operating satisfactorily.

However, some remedial works are required, especially where there are defective water meters, valves and damaged electrical control panels.

6. Recommendations

Based on the assessment, we recommend as follow:

- a local contractor be requested to price the remedial works required at each of the production boreholes to accurately determine the cost of the remedial works
- SRK Consulting be appointed to manage and implement the project on behalf of the Kouga Municipality.

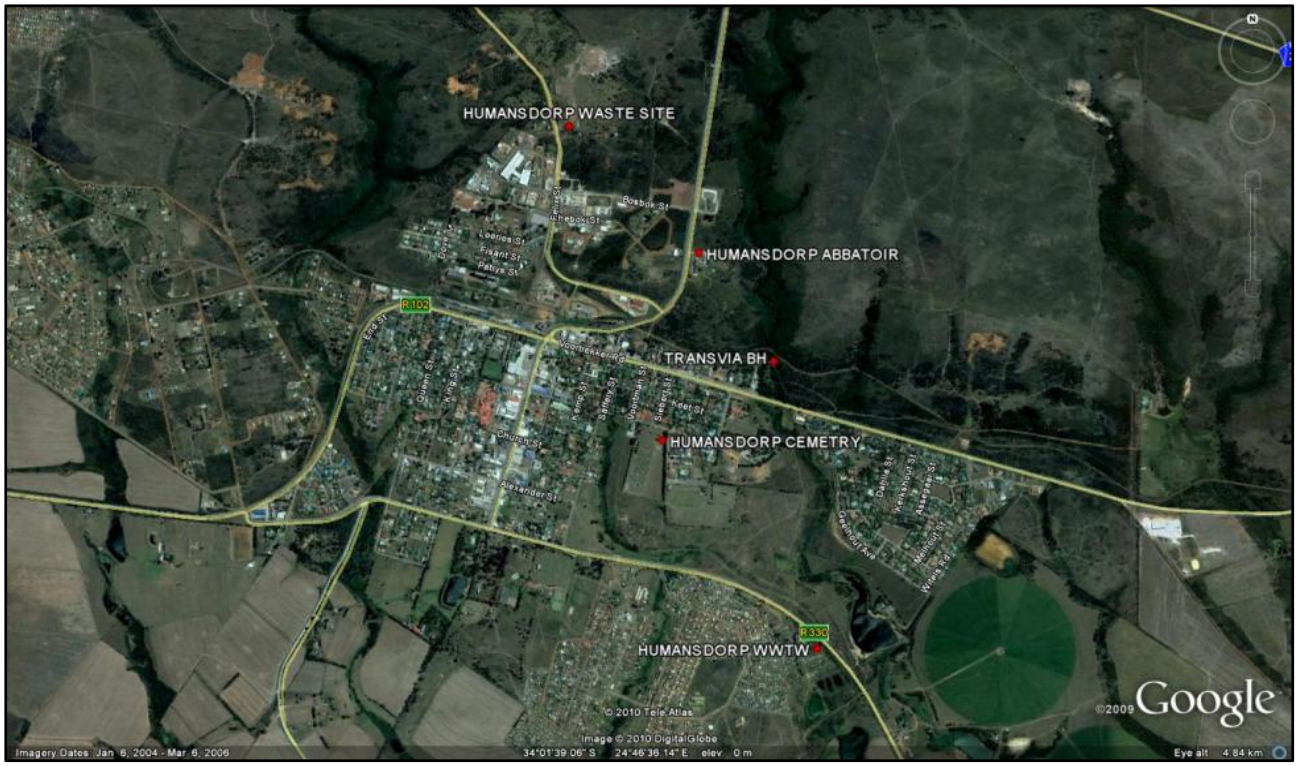
Yours faithfully,

SRK Consulting

MJ MEIRING Pr Tech Eng
Senior Technologist

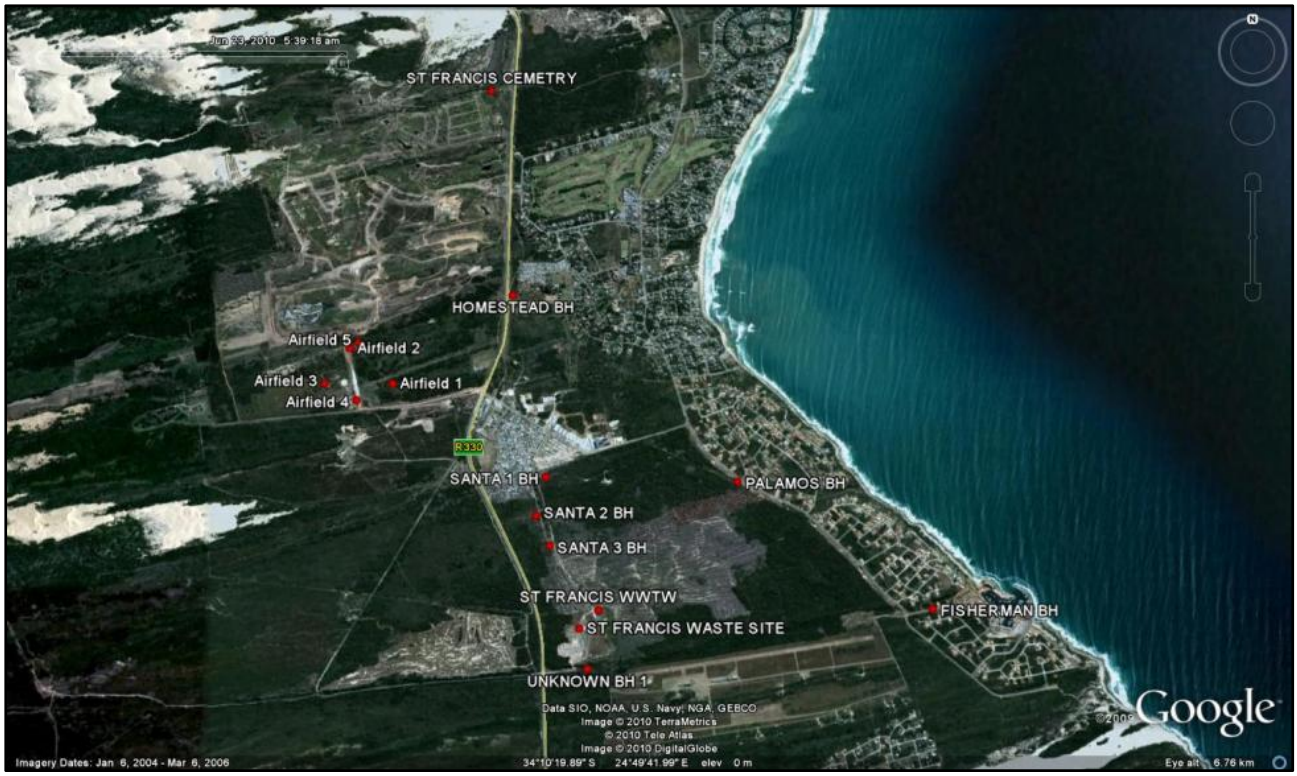
Appendices

Appendix 1: Borehole Positions



Humansdorp Borehole Positions

Jeffreys Bay Borehole Positions



St Francis Bay Borehole Positions

Oyster Bay Borehole Positions

Kruisfontein Borehole Positions

Appendix 2: Borehole Information Tables

Description	Transvia	Kruisfontein BH 1	Kruisfontein BH 2	Berg
Position				
Lat S	34°01'35.94"	33°59'50.64"	33°59'28.20"	33°59'23.94"
Long E	24°46'57.36"	24°43'57.36"	24°43'49.74"	24°42'17.82"
Borehole				
Diameter (mm)	-	-	-	-
Depth (m)	-	-	-	-
Water Level (mbs)	-	-	-	-
Pump				
Make	-	-	-	-
Model	-	-	-	-
Intake Level (mbs)	-	-	-	-
Motor				
Make	-	-	-	-
Rating (kW)	-	-	-	-
Yield				
Recommended (l/s)	-	-	-	-
Current (l/s)	-	-	-	-
In Use	Yes	Yes	Yes	Yes
Overall Condition	Good	Good	Good	Good
Meter Condition	Good	Metered at Reservoir	Metered at Reservoir	New
Control Panel Condition	New	OK	-	OK
Telemetry	No	No	No	No
Electrical Supply	OK	OK	Cut	OK
Valve Condition	No Valve	OK	OK	OK
Chamber Condition	Good	Good	Building	Good
Pipework	OK	OK	OK	OK

Humansdorp / Kruisfontein Borehole Information

Description	BH 1	BH 3	BH 4	BH 7	BH 8	BH 9	BH 10	BH 11
Position								
Lat S	34°01'01.80"	34°01'07.38"	34°01'04.68"	34°01'07.14"	34°01'02.82"	34°01'08.94"	34°01'09.84"	34°01'37.38"
Long E	24°54'33.18"	24°54'37.08"	24°54'30.84"	24°54'29.04"	24°54'29.52"	24°54'30.60"	24°54'15.06"	24°54'02.40"
Borehole								
Diameter (mm)	-	-	-	-	-	-	-	-
Depth (m)	97.5	104	98.1	140	73.2	-	78	130
Water Level (mbs)	17.9	31	39.45	34	-	28	36	29.9
Pump								
Make	Aquanox	Aquanox	Aquanox	Aquanox	Aquanox	Aquanox	Aquanox	Aquanox
Model	-	QF - N125 - 07 - 6	QF - 75 / 12	QF - 50	-	-	QF - 150 - 05	QF - 100 - 14
Intake Level (mbs)	63	63	60	78	42	-	20	90
Motor								
Make	Franklin	Franklin	Sumoto	Franklin	Franklin	Franklin	Sumoto	Franklin
Rating (kW)	15	30	15	11	11	30	18.5	30
Yield								
Recommended (l/s)	26.6	20.54	-	23.62	22.61	38.05	27.93	30.82
Current (l/s)	13.1	-	-	-	11.31	18.54	13.66	-
In Use	Regularly	Regularly	Regularly	Regularly	Regularly	Regularly	Regularly	Regularly
Overall Condition	Good	OK	Good	Good	Good	OK	OK	OK
Meter Condition	Good	Good	Good	Good	Good	Good	Good	Good
Control Panel Condition	Good (Main control room)	Good (Main control room)	Good (Main control room)	Good (Main control room)	Good (Main control room)	Good (Main control room)	New	New
Telemetry	Fine (at main control room)	Fine (at main control room)	Fine (at main control room)	Fine (at main control room)	Fine (at main control room)	Fine (at main control room)	Fine (at main control room)	Fine (at main control room)
Electrical Supply	Fine (Exposed)	Fine (Exposed)	Fine (Exposed)	Fine (Exposed)	Fine (Exposed)	Fine (Exposed)	Fine (Exposed)	Fine (Exposed)
Valve Condition	OK	OK	OK	OK	Good	OK	OK	OK
Chamber Condition	No Chamber	No Chamber	No Chamber	No Chamber	No Chamber	No Chamber	No Chamber	No Chamber
Pipework	OK (Weathered)	OK (Asbess)	OK (Weathered)	OK (Weathered)	OK (Weathered)	OK (Weathered)	OK (Weathered)	OK (Weathered)

Jeffreys Bay Borehole Information

Description	Airfield 1	Airfield 2	Airfield 3	Airfield 4	Airfield 5
Position					
Lat S	34°10'18.8"	34°10'11.8"	34°10'18.7"	34°10'22"	34°10'10.6"
Long E	24°48'40.8"	24°48'30.5"	24°48'24.6"	24°48'32.2"	24°48'32.5"
Borehole					
Diameter (mm)	165	165	165	165	165
Depth (m)	94	82	88	82	65
Water Level (mbs)	Unknown	25.8	50+	50+	29.7
Pump					
Make	Jacuzzi	Jacuzzi	Jacuzzi	Jacuzzi	SAAR
Model	6H5-1100	6H5-1100	6H5-1100	6H5-1100	D150-15
Intake Level (mbs)	93	68	70	68	14
Motor					
Make	Franklin	Franklin	Franklin	Franklin	Grundfos
Rating (kW)	5.5	11	11	11	15
Yield					
Recommended (l/s)	6	5	4	1	1
Current (l/s)	6.7	-	3	7	1.32
In Use	Yes	No	Yes	Yes	Yes
Overall Condition	Poor	Fair	Poor	Fair	Poor
Meter Condition	Good	-	Not Working	Good	Good
Control Panel Condition	OK	-	Bad	OK	OK
Telemetry ?	No	-	No	No	No
Electrical Supply ?	OK	-	OK	OK	OK
Valve Condition	Poor	-	Poor	Fair	Fair
Chamber Condition	Poor	Fair	Fair	Fair	Poor
Pipework?	OK	-	OK	OK	OK

St Francis Borehole information (Airfields)

Description	Homestead	Palamos	Fisherman	Santa 1	Santa 2	Santa 3	Unknown 1
Position							
Lat S	34°10'01.26"	34°10'38.22"	34°11'02.94"	34°10'37.20"	34°10'44.76"	34°10'50.64"	34°11'14.34"
Long E	24°49'09.36"	24°50'02.88"	24°50'48.48"	24°49'17.46"	24°49'15.18"	24°49'18.42"	24°49'27.30"
Borehole							
Diameter (mm)	156	156	152	166	166	-	-
Depth (m)	200	200	80	70	88	100	-
Water Level (mbs)	1.5	3.63	1.46	3.96	1.68	-	-
Pump							
Make	-	-	-	-	-	-	No Pump
Model	-	-	-	-	-	-	-
Intake Level (mbs)	-	-	-	-	-	-	-
Motor							
Make	-	-	-	-	-	-	No Motor
Rating (kW)	11	7.5	7.5	5.5	7.5	11	-
Yield							
Recommended (l/s)	5	5	5	3	5	-	-
Current (l/s)	3.454	9.456	7.377	1.457	1.476	6.451	-
In Use	By Golf course	When Needed	When Needed	When Needed	When Needed	When Needed	No
Overall Condition	Poor	Fair	Poor	Poor	Poor	Poor	-
Meter Condition	No Meter	New Magflow Meter	New Magflow Meter	New Meter	New Meter	New Meter	-
Control Panel Condition	Good	Good	Good	Good	Good	Good	-
Telemetry	No	No	No	No	No	No	-
Electrical Supply	Fine	Fine	Fine	Fine	Fine	Fine	-
Valve Condition	Old	New Valve	Old but working	Electrical valves	Old	Old	-
Chamber Condition	Bad	OK	Fair	Bad	Bad	Bad	-
Pipework	Bad	OK	Old	OK	OK	OK	-

St Francis Borehole information (Other)

Description	Unknown 2	Katunga
Position		
Lat S	34°09'38.34"	34°10'17.22"
Long E	24°39'12.90"	24°39'40.68"
Borehole		
Diameter (mm)	-	-
Depth (m)	-	-
Water Level (mbs)	-	-
Pump		
Make	-	-
Model	-	-
Intake Level (mbs)	-	-
Motor		
Make	-	-
Rating (kW)	-	-
Yield		
Recommended (l/s)	-	-
Current (l/s)	-	-
In Use	No	When Needed
Overall Condition	Poor	Poor
Meter Condition	-	OK
Control Panel Condition	Poor	Fair
Telemetry	No	No
Electrical Supply	OK	OK
Valve Condition	-	Fair
Chamber Condition	No Chamber	No Chamber
Pipework	Fair	Fair

Oyster Bay Borehole Information

Appendix 3: Photographs

Humansdorp

Transvia Borehole

Jeffreys Bay

Borehole 1

Borehole 3

Borehole 4

Borehole 7

Borehole 8

Borehole 9

Borehole 10

Borehole 11

St Francis Bay

Airfield 1

Airfield 3

Airfield 4

Airfield 5

Homestead

Palamos

Fisherman

Santa 1

Santa 2

Santa 3

Oyster Bay

Unknown 2

Katunga

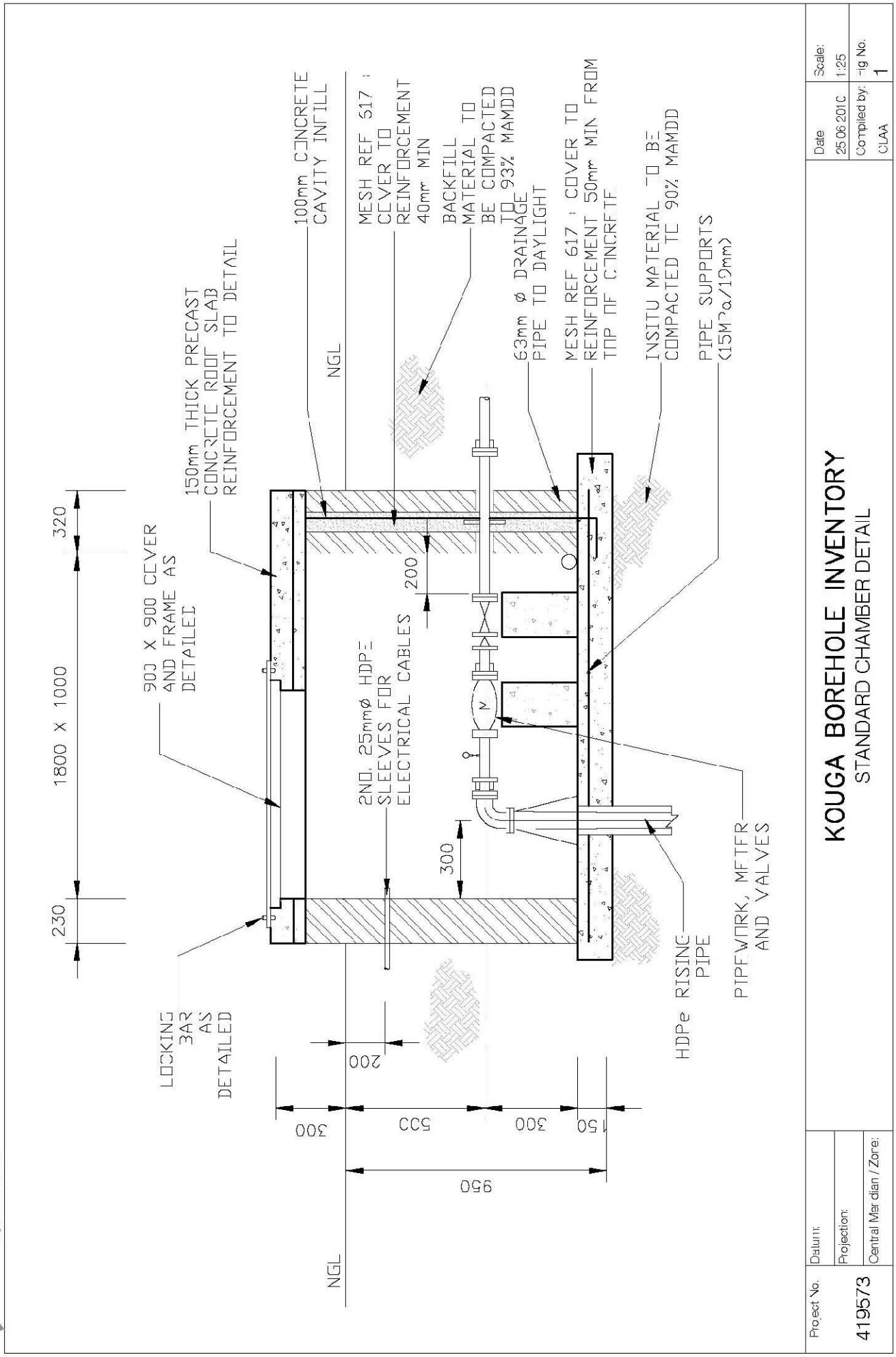
Kruisfontein

Kruisfontein Borehole 1

Kruisfontein Borehole 2

Berg Borehole

Appendix 4: Borehole Chamber Detail


150mm THICK PRECAST CONCRETE ROOF SLAB REINFORCEMENT TO DETAIL
100mm CONCRETE CAVITY INFILL
MESH REF 617 : COVER TO REINFORCEMENT 40mm MIN
BACKFILL MATERIAL TO BE COMPACTED TO 93% MAMDD
63mm ø DRAINAGE PIPE TO DAYLIGHT
MESH REF 617 : COVER TO REINFORCEMENT 50mm MIN FROM TOP OF CONCRETE
INSITU MATERIAL TO BE COMPACTED TO 90% MAMDD
PIPE SUPPORTS (15M'a/19mm)
900 X 900 COVER AND FRAME AS DETAILED
2NO. 25mmø HDPE SLEEVES FOR ELECTRICAL CABLES
LOCKING BAR AS DETAILED
HDPe RISING PIPE
PIPEWORK, METER AND VALVES
NGL
NGL
320
1800 X 1000
230
200
300
200
300
500
300
150
950
KOUGA BOREHOLE INVENTORY
STANDARD CHAMBER DETAIL
Project No. 419573
Datum:
Projection:
Central Meridian / Zone:
Date 25 06 2010
Compiled by: CLAA
Scale: 1:25
Fig No. 1